NETWORK WORLD
The Newsweekly of User Networking Strategies
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# Novell preps NetWare 386 for unveiling

By Susan Breidenbach
and Laura DiDio
Network World Staff

SAN FRANCISCO — Novell, Inc. is expected next Monday to unveil NetWare 386, the next generation of its widely used local network operating system.

Designed to take advantage of Intel Corp.'s 80386 microprocessor, NetWare 386 will enable a single file server to support as many as 1,000 users, a tenfold increase over the current limit of 100.

Novell will also outline its plans to support the OS/2 SQL Server data base engine released last week by Ashton-Tate Corp. The announcements will set the stage for Novell's annual developers' conference, which will be held in Salt Lake City the week of May 15.

At the conference, Novell is expected to provide independent software vendors and corporate developers with detailed information about NetWare 386. While the existence of the product has been known for some time, Novell has kept the specifics "pretty close to the vest," said Frank Dzubeck, president and chief executive officer of Communications Network Architects, Inc., a network consultancy in Washington, D.C.

According to sources, the Net-

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PHOTO ©1989 TERRY ARTHUR/BLACK STAR

COS Chief Executive Officer Lincoln Faurer talks about the COS Mark, a seal of approval given to products that pass OSI conformance tests.

# *COS kicks off program to certify OSI conformance*

## COS Mark promises to aid users by ensuring products comply with open system standards.

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — The Corporation for Open Systems International (COS) last week unveiled its long-awaited COS Mark program and announced the first three products certified as OSI-compliant under the plan.

The COS Mark certifies that a product has passed a series of Open Systems Interconnection conformance tests and shows that the vendor has committed to work with other COS Mark vendors to resolve interoperability problems.

Users applauded the program. Bud Huber, manager of corporate networking standards at Hughes Aircraft Co. in Long Beach, Calif., said his company plans to specify the COS Mark as an acceptable conformance test for OSI products. "Up until now, we had to conduct our own interoperability tests," he said.

Third-party conformance testing could save Hughes Aircraft between 5% and 10% on its overall costs for new communications equipment, Huber said. "The real price of a product includes the costs of bringing it in and shaking it down," he said. "It's not just the price on the box."

The first products certified un-

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# AT&T fractional T-1 services hit market

## Accunet Spectrum services offer bandwidth in 64K bit/sec increments, promise cost savings.

By Bob Wallace
Senior Editor

BASKING RIDGE, N.J. — AT&T plunged into the fractional T-1 service market last week with the introduction of a family of high-speed, all-digital transmission services.

AT&T's Accunet Spectrum of Digital Services will enable users to buy bandwidth on a carrier-supported T-1 line in 64K bit/sec increments, each of which will cost less than a comparable 56K bit/sec Dataphone Digital Service line.

**As expected, AT&T unveils wideband packet tools, page 6.**

Accunet Spectrum services support digital transmission at speeds of 56K, 64K, 128K, 256K, 512K and 768K bit/sec ("AT&T studies new services," *NW*, Sept. 7, 1987).

Besides offering a lower cost alternative to traditional leased facilities, the services fill the gap between the company's highest speed Dataphone Digital Service (56K bit/sec) and 1.544M bit/sec T-1 services.

In addition to the new services, AT&T said it is migrating the interoffice component of all analog private lines to higher quality digital facilities. AT&T said it would benefit from the more efficient digital facilities and planned to pass those savings, which could be as much as 15%, on to users.

"Many customers will be [giv-

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**INSIDE**

PHOTO ©1989 SUSAN STEINKAMP

Policy insights from ex-FCC chief Dick Wiley, page 40.

# Wall St. eyes cost-cutting custom nets

By Barton Crockett
Senior Editor

NEW YORK — The Prudential Insurance Co. of America, owner of Prudential-Bache Securities, Inc., said last week it is seeking bids for a custom network the firm hopes will slash communications costs by millions of dollars annually.

Also last week, PaineWebber, Inc. said it is taking steps to cut its $100 million annual network budget by $26 million over the next two years.

The users, who discussed their plans at the Securities Industry Association's Information Management Conference and Exhibit here, are among a growing number of Wall Street firms struggling to cut communications costs during the dog days of the post-crash era.

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## NETLINE

**CODEX UNVEILS** a new release of its 9800 net management system. Page 2.

**MOTOR VEHICLES** departments link up in a net that tracks problem drivers. Page 2.

**CONGRESS TACKLES** yet another bill to free the RBHCs. Page 4.

**MCI WINS A DEAL** with a major manufacturing company to provide Vnet service. Page 6.

**PRESIDENT BUSH'S** policymakers face a host of leftover issues. Page 53.

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NEWSPAPER

## FEATURE

# SAA lineup means new game plan for IBM users

By Marvin Chartoff
and David Passmore
Special to Network World

MANAGEMENT UPDATE

Baseball team managers have been using cooperative processing for years. They put the right players in the right positions, and then they train them to make sure everybody does the right thing at the right time.

Communications managers have a similar job. To design an effective cooperative processing system, they need the right components and the right architecture to make the parts work together as a team. In the IBM league, Systems Application Architecture (SAA) is the game plan for cooperative processing.

Cooperative processing is the next logical step beyond distributed processing, which allows traditional mainframe applications to be moved out to

(continued on page 45)

# Codex offers new version of integrated control tool

## Company execs discuss new features of 9800 Net Management System, future product plans.

By Paul Desmond
Staff Writer

CANTON, Mass. — Codex Corp. will announce tomorrow a new release of its 9800 Network Management System that broadens support for Codex devices and paves the way for support of other vendors' products and net management systems.

In an interview with *Network World* here last week, Codex officials demonstrated the new features supported in Release 2 of the 9800 and discussed future plans for the product. The 9800 is net management software based on Open Systems Interconnection protocols. It runs on an Apollo Computer, Inc. Domain Series 3000 workstation and provides a graphical view of a network.

Release 2 supports Codex's full line of modems as well as the company's statistical multiplexers, which were supported in the first release.

The 9800 is also the platform Codex will use to forge links, using OSI-based net management protocols, with other network management systems, said Stephen Mank, director of network management systems marketing at Codex. Those other systems include IBM's NetView and products based on Digital Equipment Corp.'s Enterprise Management Architecture, he said.

Although Mank would not say when or how the 9800 will link to NetView or EMA products, he said the NetView link will not support NetView/PC, IBM's tool for integrating other vendors' products under the NetView umbrella.

Future 9800 releases due out later this year will offer beefed-up support for Codex's T-1 multiplexers, supplied by StrataCom, Inc., as well as Codex's recently announced 6600 Series packet switches and its other X.25 products, said John Thibault, senior vice-president of product operations at Codex ("Codex pumps up net line with X.25 packet switches," *NW*, April 3).

Currently, Codex's 6290 Integrated Digital Exchange T-1 multiplexers can pass alarms to the Apollo workstation, and the 9800 console operator can call up the T-1 device's net management screen using a terminal-emulation feature. But that windowing technique is not truly integrated management, Thibault said.

Integration, according to Thibault, means providing a common user interface, data base, in-

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# Data network allows DMVs to track problem drivers

## State motor vehicle agencies build nationwide net.

By Bob Brown
Senior Writer

ARLINGTON, Va. — State motor vehicles departments across the country are linking up in a data network that is designed to help the agencies share information and clamp down on problem drivers.

The network will enable officials at motor vehicle divisions in all 50 states and the District of Columbia to exchange electronic mail as well as access bulletin boards and central data bases containing information about licensed commercial drivers, according to an official involved in the project.

By accessing the data bases, officials will be able to check various information, including whether an applicant for a commercial driver's license already holds such a license in another state and whether the applicant has had a license of any kind suspended or revoked.

The network project is being spearheaded by the American Association of Motor Vehicle Administrators (AAMVA). The network — dubbed AAMVAnet — is expected to save motor vehicles departments time and money by sharply reducing the paperwork they exchange to keep track of commercial vehicle drivers, who often have licenses in more than one state.

### Safer roads the goal

The network will make highways safer by making sure commercial vehicle drivers are qualified to hold a license, said Richard Juve, the manager of AAMVAnet. "The goal is to have a tool for motor vehicles personnel throughout the U.S. to have direct contact with their counterparts in other states," Juve said. "That way, the public will be better served."

AAMVAnet was born from the federal government's Commercial Motor Vehicle Safety Act of 1986, which called for state motor vehicles departments to establish a central clearinghouse of information about commercial drivers.

The act was passed to halt the

*(continued on page 76)*

# Briefs

**IBM plans Texas-sized rollout.** IBM is expected to announce tomorrow enhancements for its 3174 cluster controller and a downsized addition to its 3745 front-end processor line at the International Communications Association's 42nd Annual Conference and Exposition in Dallas.

IBM reportedly will cut the price of its 3174 cluster controller and add new capabilities, according to a source close to IBM who requested anonymity. Industry analysts said IBM may announce enhancements that make the 3174 a PU Type 2.1 node in a Systems Network Architecture network, as opposed to its current designation as a PU Type 2. That would give the 3174 enhanced networking capabilities, including the ability to act as an SNA Distribution Services node capable of storing and forwarding data such as electronic mail, analysts said.

IBM may announce a smaller version of the 3745 that will be less powerful and support fewer lines than the 3720 front-end processor, the source said.

**DEC to deal with StrataCom.** Digital Equipment Corp. last week confirmed it will announce two new products and a marketing agreement with StrataCom, Inc. tomorrow at the International Communications Association's 42nd Annual Conference and Exposition in Dallas.

DEC will announce a marketing agreement with StrataCom under which DEC will recommend StrataCom's Integrated Packet Exchange T-1 multiplexers to its customers.

DEC will also unveil a VT terminal-emulation card for its DECserver 550 Terminal Server that will enable IBM 3270-type terminals to access applications on DEC VAXes, according to Josh Gonze, a research analyst with International Data Corp., a Framingham, Mass.-based research firm. Gonze was briefed by DEC and StrataCom. DEC will also announce the MUXserver 300, a combined terminal server and statistical multiplexer that connects remote devices to an Ethernet, Gonze said.

**Start your data base engines.** Ashton-Tate Corp. last week officially began shipping the heralded OS/2 SQL Server. Codeveloped by Ashton-Tate, Sybase, Inc. and Microsoft Corp., SQL Server is the first OS/2 application to attract widespread user interest. SQL Server is a relational data base management system that runs on a server in an OS/2 LAN Manager network and provides data to applications running on workstations.

**Tariff 12 opponents mull appeal.** MCI Communications Corp., US Sprint Communications Co. and the Independent Data Communications Manufacturers Association (IDCMA) — vocal opponents of AT&T's Tariff 12 — last week said they may file an appeal with the U.S. Court of Appeals for the District of Columbia seeking to overturn the Federal Communications Commission's recent decision endorsing the custom net tariff.

Critics of the decision can ask the FCC to reconsider its order or appeal the ruling to the federal court. Representatives from MCI and IDCMA said they had not decided how to proceed. A source at US Sprint said the carrier will likely seek an appeal.

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**Data Communications**
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**Network World**
**Box 9171, 375 Cochituate Road**
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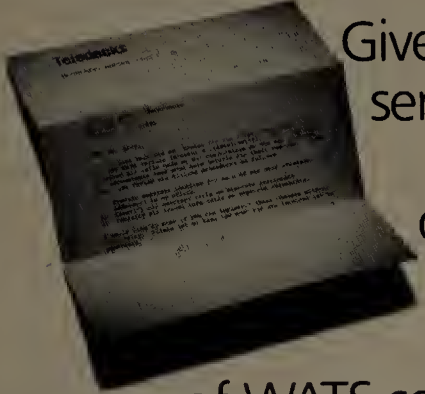

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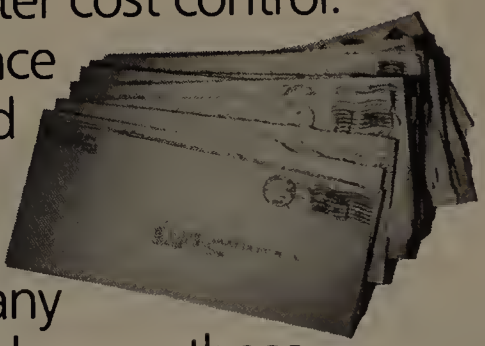

They also told us they wanted the convenience of call accounting, billing by office location, and international calling. Done.

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# Congress mulls latest bill to loosen MFJ restrictions

**By Gail Runnoe**
Washington Correspondent

WASHINGTON, D.C. — Two members of the U.S. House of Representatives last week introduced legislation that would free the seven regional Bell holding companies to provide information services and to manufacture equipment.

The Consumer Telecommunications Services Act of 1989, sponsored by Rep. Al Swift (D-Wash.) and Rep. Thomas Tauke (R-Iowa), is the third bill filed by the two Congressmen since 1985 that seeks to loosen Modified Final Judgment restrictions on the RBHCs. Swift said it is time for Congress to reassert its role and regain control of telecommunications policy. Now that the breakup of AT&T is complete, he said, "we need to move on. You can't make sound policy from the narrow perspective of antitrust law."

Since the Modified Final Judgment took effect in 1984, there have been several efforts by Congress to lift RBHC business restrictions or to shift oversight of the Modified Final Judgment from the courts to Congress and the Federal Communications Commission. While some observers say this year's Swift-Tauke bill has a better chance of passing than earlier legislative attempts, others say Congress will make no greater progress on telecommunications issues this year than it has in the past.

The Swift-Tauke bill may succeed because it has strong consumer protection provisions, according to aides to the sponsors. In the information services arena, the bill requires the RBHCs to provide competing vendors with nondiscriminatory interconnection to their nets. The bill also would prevent carriers from purchasing equipment only from their own manufacturing arms.

The RBHCs would be prohibited from using revenue from telephone operations to subsidize information services or manufacturing efforts, and telephone ratepayers would be protected from paying for failed ventures in those areas.

### RBHC reaction

Although the RBHCs were generally supportive of the Swift-Tauke initiative, some claimed the bill puts too many limitations on them. Bell Atlantic Corp. said it is concerned that "several of the bill's mechanisms for making information services available [are] too complicated." BellSouth Corp. said the bill "doesn't go far enough" and "leaves in place restrictions on our ability to economically bring information services to many areas."

Hearings on the Swift-Tauke bill are scheduled to begin Thursday in the House Subcommittee on Telecommunications and Finance.

David Aylward, managing partner of National Strategies, Inc., a marketing consulting firm in Washington, D.C., said passage of any telecommunications bill by Congress is unlikely. "Telephone issues are not understood by most of the public," he said. "Therefore, they're not important to Congress."

Alan Pearce, president of Information Age Economics, a Washington-based telecommunications research firm, said Congress purposely delayed action on past telecommunications legislation for two reasons. "Most members of Congress wanted to see what evolved after the breakup of AT&T," he said.

Also, Congress was hesitant to pass any bill that would put more power in the hands of the FCC. "Most House and Senate members suspected a Reagan-controlled FCC," he said.

Ken Phillips, chairman of legislative affairs for the Corporate Committee of Telecommunica-

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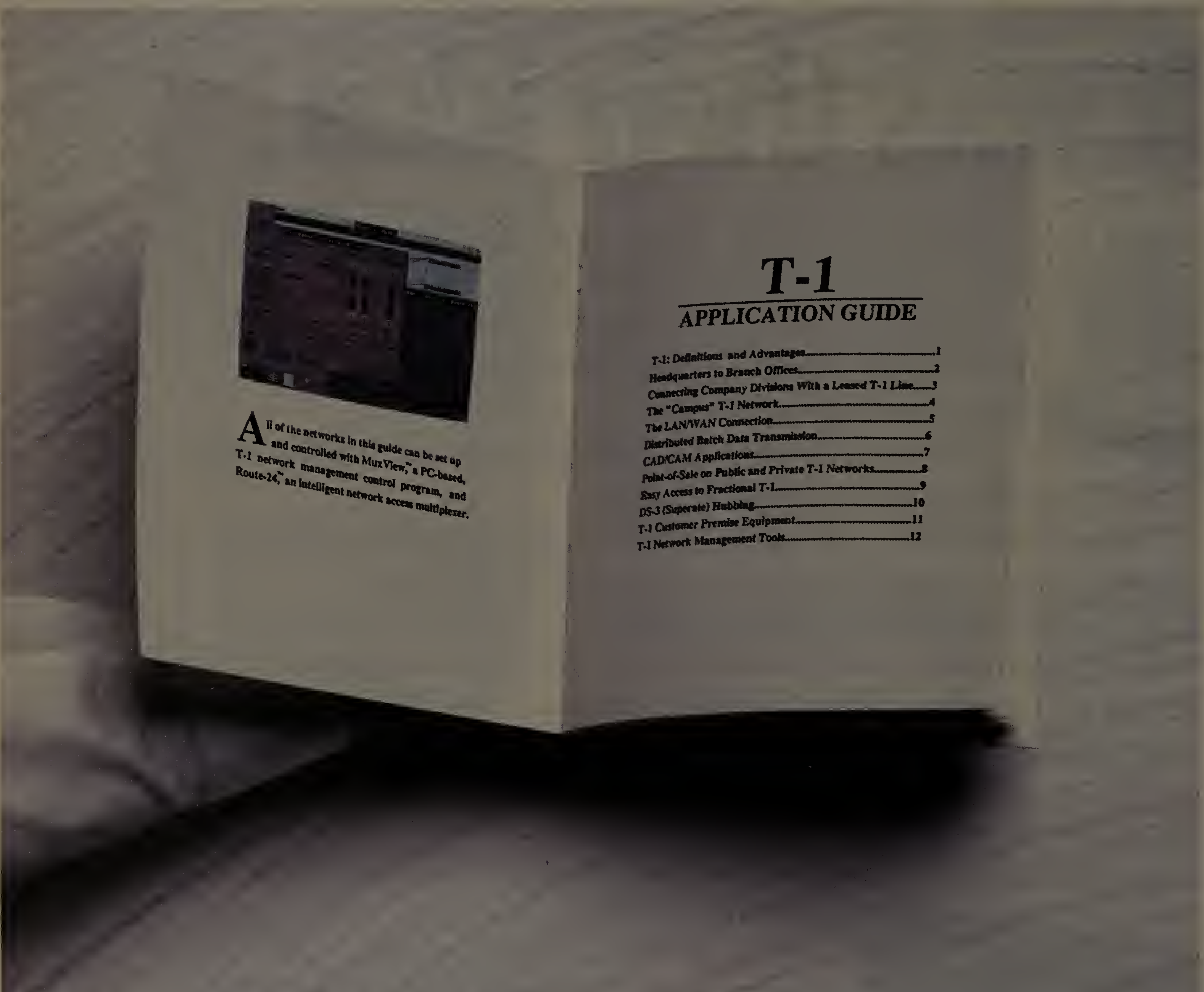
**Clarification:** The Worth Noting of the April 10 Industry Update section incorrectly stated the findings of a recent report by The Sierra Group of Tempe, Ariz. The report found that there is a growing perception that minicomputers are a less than ideal solution for networked personal computer work groups.



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# McDermott chooses MCI to provide virtual net service

Net to link firm's headquarters, low-traffic sites.

**By Anita Taff**
Washington Bureau Chief

NEW ORLEANS — McDermott, Inc., a $3 billion manufacturer of offshore drilling and power generation equipment, has signed a multimillion-dollar contract with MCI Communications Corp. for Vnet virtual network service, *Network World* has learned.

McDermott will use the digital Vnet services to link its headquarters here and more than 80 low-volume traffic sites, supplementing the company's T-1 backbone that connects 14 major locations, said Glen Runyon, manager of corporate telecommunications.

The company wanted to upgrade its voice network for smaller locations, most of which were supported by analog tie lines, but traffic levels were too low to cost-justify digital T-1 lines, he said.

The virtual network, which became operational early last month, already supports 14 locations. These sites and the 14 others on the backbone together generate 1.5 million minutes of traffic per month, which represents between 65% and 70% of the company's total traffic volume, Runyon said. By the end of the year, 72 additional low-traffic locations will be added to the virtual network.

The company's backbone network includes 16 T-1 links provided by Williams Telecommunications Group, Inc. and various regional Bell holding companies, as well as Integrated Digital Network Exchange multiplexers from Network Equipment Technologies, Inc.

Runyon, who professes to be a true believer in the "Be your own Bell" philosophy, said McDermott opted for MCI because it offered capabilities not available from AT&T, the rival bidder on the project.

"The major difference turned out to be MCI's [Network Information Management System] and [Customer Information Manager] capabilities," he said.

> "Did I ever consider Tariff-12? Absolutely not," Runyon said.
>
> ▲▲▲

The Network Information Management System allows customers to access, via dedicated lines, MCI's Vnet data base to monitor net operations. The Customer Information Manager is a software program that allows customers to update the Vnet data base to change information such as dialing plans.

Runyon said he believes it should be the customers' responsibility to oversee the net. "We maintain, operate and monitor the network from a central point here in New Orleans, so we had to have capabilities to understand what's going on all over the country from a central site," he said.

Based on that philosophy, Runyon rejected the idea of making an arrangement for an AT&T Tariff 12 network when he began plans for a new corporate net in 1986. Under Tariff 12, AT&T would design and control the network.

"Did I ever consider Tariff 12? Absolutely not," Runyon said. "It never even crossed my mind that we would give up control of telecommunications."

Runyon said he was concerned not only about the prospect of turning network technology over to a carrier but also that decisions of the Federal Communications Commission could bear heavily on network operations.

"I would not subject McDermott to the whims and vagaries that I thought [General Electric Co. and E.I. du Pont de Nemours & Co. — the first two Tariff 12 customers] were about to go through with Tariff 12," Runyon said.

"AT&T's got them now. They have no choice. What's GE going to do, remobilize its telecom staff and decide to go back to what they were doing before? Can't do it," he said.

Although Runyon said that being the master of his own network has worked well, he emphasizes that it is no easy task.

Although the company has saved $750,000 annually by integrating voice and data transmissions from major locations on the backbone, he said it took about five years from planning to final installation and required several telecommunications staff members devoted almost exclusively to the task.

# AT&T revises pricing for Int'l City Center Service

**By Sarah Vandershaf**
West Coast Correspondent

BASKING RIDGE, N.J. — AT&T last week filed reduced rates and a revamped pricing scheme for its International City Center Service (ICCS) and opened it up to domestic customers of its Software-Defined Network (SDN) service and Enhanced Private Switched Communications Service (EPSCS).

ICCS is a usage-sensitive, custom switched international network service targeted at users with medium to heavy voice traffic requirements between New York and the UK, said Bill Evans, international marketing manager for AT&T.

With this announcement, SDN and EPSCS users across the country will be able to access ICCS through more than 500 SDN serving nodes around the country, Evans said. Customers that do not use SDN or EPSCS can use private lines to access the service via a gateway in New York, Evans said, but it may only be economical for customers near the city to do so.

AT&T is implementing ICCS as the foundation for Global SDN, an effort to extend the service to international locations.

International businesses "now have to coordinate different sites, languages and [national] regulations for their networks themselves," Evans said. "With Global SDN, we manage their networks for them."

The new ICCS peak-period charges are 32 cents for the first 30 seconds and .064 cents for additional six-second intervals. Off-peak rates are 23 cents for the first 30 seconds and .045 cents for additional six-second intervals. Previously, ICCS customers were billed for the first minute of use and every additional six-second period, Evans said. Traditional long-distance services charge for each minute of use.

Non-SDN or EPSCS customers accessing ICCS through New York are also charged $250 per trunk group for the service, Evans said.

ICCS makes economic sense for international businesses with two to six hours of voice traffic a day, Evans said. Customers can place international calls by dialing seven digits. The service allows data transmission at speeds up to 9.6K bit/sec, he said.

For SDN and EPSCS customers, charges for ICCS calls from the U.S. will be included in their regular bills and detailed in accompanying reports. Charges from the UK end will be billed by the UK company.

ICCS rates are "postalized," Evans said, "just as 25 cents will send a letter anywhere in the U.S. to anywhere in the UK."

Postalized rates avoid the mass confusion that would occur if ICCS were mileage-sensitive within the U.S. and the UK and mileage-insensitive between the two countries, Evans said. The different billing structures would make it difficult to determine the

*(continued on page 8)*

# AT&T offers wideband packet tools

**By John Cox**
Senior Editor

MORRISTOWN, N.J. — As expected, AT&T last week announced wideband packet-switched network products that can be used to blend voice and data traffic in public or large private T-1 networks.

The new Integrated Access and Cross-Connect System (IACS) will enable carriers to offer variable-bandwidth high-speed virtual network services that can accommodate changing demands. IACS will also enable users to build packet networks that support voice, data and other types of traffic.

IACS was first discussed at a trade show for companies in the energy field ("AT&T to unveil details of new wideband nets," *NW*, March 27).

It consists of the Integrated Access Terminal (IAT), which packetizes voice and data for transmission over 1.544M bit/sec T-1 pipes, and a centralized network management system, the Integrated Access Controller (IAC), which is based on an AT&T 3B2/600 minicomputer.

Each IAT supports as many as 24 T-1 lines and provides cross connections at the DS0 level, according to Denise Palombo, manager of transmission product planning for AT&T Network Systems Group. When used by carriers to provide services, user sites will access the node via a T-1 or ISDN pipe, she said.

The IAT uses low bit rate voice encoding and digital speech interpolation to enable a 24-channel T-1 link to support 120 voice conversations.

"The major breakthrough is we're now able to handle voice as if it were data," Palombo said.

IACS allocates the bandwidth of each T-1 channel dynamically to meet the demands of the user application, Palombo said. This type of control is based on support of Link Access Procedure D, a CCITT standard for sending control information over the ISDN D channel.

Net managers can manage an IACS network using an IAC, which can control up to 32 nodes. Managers can reroute traffic if a T-1 link fails and can access various automated administrative and operations systems for information about alarms, performance and usage.

IACS is available now in the U.S. AT&T declined to release price information.

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# Soft-Switch offers E-mail link to X.400, TCP/IP nets

**By Jim Brown**
New Products Editor

BOSTON — Soft-Switch Corp. last week unveiled gateways for its electronic mail translation software that enable users of a variety of E-mail packages to exchange messages with X.400 and Transmission Control Protocol/Internet Protocol E-mail nets.

The gateways work with Soft-Switch Central translation software, which runs on IBM mainframes. The gateways let users of such E-mail systems as IBM's Professional Office System, Digital Equipment Corp.'s All-In-1 and VMS Mail, and Wang Laboratories, Inc.'s Wang Office exchange messages with users on public X.400 or private TCP/IP nets.

The company also announced gateway software linking Consumers Software, Inc.'s local network-based Network Courier E-mail package to Soft-Switch Central, enabling Network Courier users to exchange messages with other E-mail systems linked to Soft-Switch Central.

Users of disparate E-mail packages transmit messages to Soft-Switch Central using IBM's Systems Network Architecture Distribution Services (SNADS) protocols. Soft-Switch Central converts the E-mail format and uses SNADS to forward the message to the system running the receiving E-mail package.

**X.400 support**

Soft-Switch's X.400 Gateway enables Soft-Switch Central users to exchange messages with users on X.400-based public networks such as Telenet Communications Corp.'s Telemail 400 and MCI Communications Corp.'s MCI Mail Exchange. The product consists of an Intel Corp. 80286-based Dell Computer Corp. System 310 microcomputer outfitted with two communications boards from Eicon Technology Corp., an internal 2,400 bit/sec modem and Soft-Switch software.

One of the communications boards links the Dell Computer System 310 to an X.25 packet net. The other links the Dell System 310 to an IBM host via a Synchronous Data Link Control connection supporting IBM's LU 6.2 protocol.

The X.400 Gateway software runs under Unix Version 3 and converts messages between Soft-Switch E-mail and the International Standards Organization's X.400 E-mail formats. The X.400 Gateway is priced at $60,000.

Soft-Switch also released host-based software that implements TCP/IP's Simple Mail

*(continued on page 76)*

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## Novell preps NetWare 386

continued from page 1

Ware 386 network operating system is new from the ground up, with a new set of application program interfaces (API). It is designed to take full advantage of the 80386 chip's 32-bit architecture and 4G bytes of addressable memory. To exploit the power of NetWare 386, existing NetWare-specific applications will have to be rewritten using the new APIs but will run unmodified in 80286 emulation mode.

NetWare 386 is expected to include much of the functionality users currently must obtain via third-party add-on products, such as printer spooling and utilities for archiving files.

Another anticipated feature is a global naming facility. Global naming eases internetwork communications by assigning a name for each user and net resource.

One source said Novell will price NetWare 386 in the $7,000 to $8,000 range, up from the $4,695 list price for the company's current top-of-the-line System Fault Tolerant NetWare.

"Most users right now have little justification for migrating to NetWare 386, mainly because they have small LANs or are underutilizing their LANs," said Steve Plotkin, vice-president of Real World Systems, Inc., a Novell reseller and IBM Advanced Products dealer in Philadelphia.

Plotkin said the product will appeal to users that require fast processing, such as big insurance companies or banks that keep their local nets busy with high-volume transactions.

Novell's announcements concerning SQL Server are intended to reassure NetWare users that they will have access to the data base product without having to adopt Microsoft Corp.'s OS/2 LAN Manager, a competing network operating system.

SQL Server, developed by Sybase, Inc. with help from Microsoft and Ashton-Tate, has generated more interest than any other application for the OS/2 environment. Microsoft is hoping it will spark the sluggish sales of OS/2 and OS/2 LAN Manager.

Ashton-Tate began shipping SQL Server last week, and it currently runs only on LAN Manager networks and IBM's LAN Server.

SQL Server is not compatible with the installed base of NetWare-based local nets because it uses the Named Pipes interprocess communications facility in OS/2 to interact with front-end applications on workstations.

NetWare developers report that they have been promised a Named Pipes requestor for OS/2 workstations this month and expect a corresponding requestor for DOS workstations to follow within 60 days. Ed Cooper, a marketing director at Novell, said a version of the OS/2 requestor with Named Pipes support will be available in the third quarter for $200 per site. He would not provide pricing and availability for the DOS version. ▣

## Congress mulls latest MFJ bill

continued from page 4

tions Users, said he feels there is "more steam behind this year's efforts" than in the past. "The FCC set the tenor for deregulation this year with price caps and Tariffs 12 and 15," he said. "Something might get through in a modified form."

Arthur Bushkin, a principal with A.T. Kearney, Inc., a Chicago-based international management consulting firm, said he doubts Congress will ever be able to pass legislation that would address national telecommunications policy. "Certainly, the experience of the last 10 to 15 years has shown that Congress does not have the time, staff or interest to deal with issues of technology evolution on a consistent and continuing basis," he said. ▣

## AT&T revises pricing for ICCS

continued from page 6

cost of an individual call, he said.

ICCS also offers network security features, Evans said. Customers can designate certain sites or ranges of telephone numbers to have access to the service, thereby blocking unauthorized calls.

AT&T has plans to expand ICCS this year to allow customers that do not use SDN or EPSCS to gain access to the service through AT&T's 500-plus SDN nodes, Evans said. U.S. service to the UK is provided by British Telecom International, Inc. ▣

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# Codex offers integrated control

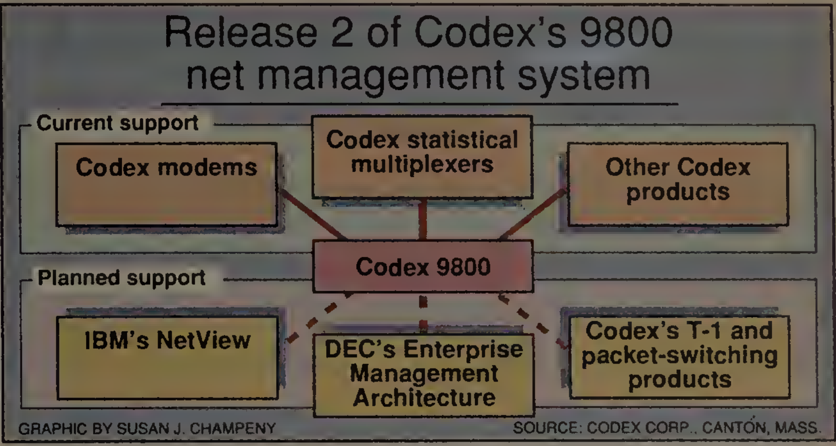
continued from page 2

ventory mechanism, and alarm reporting and control scheme for different classes of devices. Providing windows to other net management systems is only consolidation, he said, not integration.

"People have been using the term integrated too loosely, and incorrectly," Thibault said.

Release 2 represents the first step toward realization of the Codex definition of integration since it provides control for two different classes of devices — modems and multiplexers — under the same management system. That means the user works with the same screens and command language to control a variety of devices, said Laura Liotta, product manager for the 9800.

Release 2 of the 9800 enables users to manage Codex's 2600 line of high-speed, leased-line modems as well as its 2500 Series modems, 2123 limited-distance modems, 2150 and 2160 Digital Service Unit/Channel Service Units, Model 6740 concentrator, 6760 statistical multiplexer and the 6742 and 6745 Flexible Network Exchange statistical multiplexer/packet switches.


Release 2 of Codex's 9800 net management system
Current support
Codex modems
Codex statistical multiplexers
Other Codex products
Codex 9800
Planned support
IBM's NetView
DEC's Enterprise Management Architecture
Codex's T-1 and packet-switching products

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: CODEX CORP., CANTON, MASS.

Among the new features of Release 2 is a capability that allows different components of the management system to exchange data, Liotta said. For example, inventory data on a device will automatically be transferred to any trouble ticket established for that device, even if it is a non-Codex product, she said.

Another integral new component is the 9820 Communications Application Processor (CAP), a hardware device that off-loads the task of polling managed devices from the central Apollo workstation. It can accept net management data from as many as 1,800 devices and concentrates the data for delivery to the 9800 workstation.

In addition, CAP will, at least initially, incorporate a so-called software agent that converts proprietary net management protocols into the Manager-Agent protocol. That protocol is Codex's version of the emerging OSI Common Management Information Protocol (CMIP).

Codex's Manager-Agent protocol will be updated to incorporate any changes to CMIP, Thibault said. Codex officials would not say whether CAP will be used as an interface to non-Codex devices. But they did say a tool kit will be released by the end of the year that will help other companies link their net management systems to the 9800.

**Net maps**

Release 2 also provides the Views capability, which allows net managers to construct network maps to suit their needs. A View can represent the topology of network devices in a single city or just those devices needed to run a certain application, Mank said. For example, a bank could construct separate Views for its automated teller and back office accounting networks.

That feature is a plus for Codex, according to analysts. "It clearly shows an understanding of the applications as opposed to just boxes," said Rosemary Cochran, a principal with the Dedham, Mass.-based consultancy Vertical Systems Group. "That's a nice feature — to be able to segregate an application from the net."

Release 2 of the 9800 Network Management System is shipping now. Pricing starts at $50,000 and includes installation and configuration by Codex personnel, as well as training and a year's subscription for any new software releases.

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*Datapro, *User Ratings of Network Management Systems*, September, 1988.
**International Data Corporation (IDC), *Quantitative Analysis of the Network Management Market*, October, 1988.

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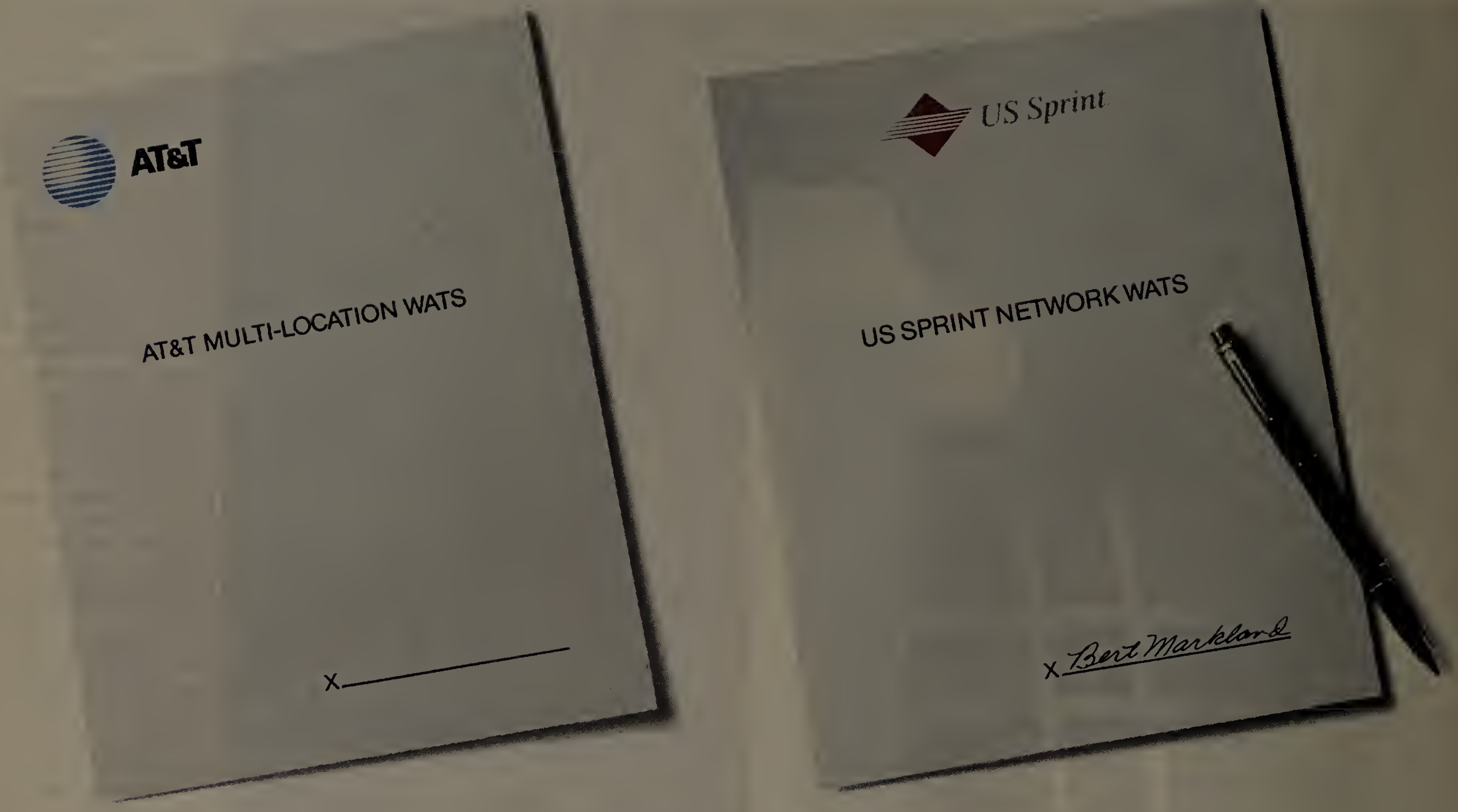

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# INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

## Worth Noting

U.S. sales of electronic conferencing equipment and related bridging services are expected to increase from $200 million in 1988 to more than $700 million by 1993, according to a new study by Venture Development Corp., a Natick, Mass.-based market research firm.

## People & Positions

**Anton Campanella**, president and chief executive officer of **New Jersey Bell Telephone Co.**, last week was elected president of **Bell Atlantic Corp.**, the Philadelphia-based regional Bell holding company. Campanella will become chairman of New Jersey Bell until he assumes his responsibilities at Bell Atlantic on July 1. He will be responsible for Bell Atlantic's telephone units as well as technical and support services.

As expected, **Raymond Smith**, president and CEO of Bell Atlantic, was elected chairman of the firm, effective July 1. Smith succeeds **Thomas Bolger**, who retired. Smith will give up his title as president but will remain CEO. **James Cullen** was named to replace Campanella as president and CEO of New Jersey Bell effective today. Previously, Cullen was chairman, president and CEO of Bell Atlantic Enterprises Corp., a subsidiary of Bell Atlantic.

**3Com Corp.** announced last week that **Robert Belleville**, a former employee of Apple Computer, Inc., has been named consulting engineer in the Station-Server Systems Unit of the company's Distributed Systems Division.

In the mid-1980s, Belleville was Apple's director of engineering and helped to create the company's Macintosh, LaserWriter and AppleTalk products. ◻

## Allen gets high marks for first year at AT&T's helm

### CEO builds on strong foundation left by Olson.

By Gail Runnoe
Washington Correspondent

BASKING RIDGE, N.J. — One year after assuming the chairmanship of AT&T, Robert Allen has increased the firm's profitability by continuing to cut costs, waging an aggressive new marketing campaign and focusing on customer needs, analysts said.

While most industry observers believe Allen is basically staying the course charted by his predecessor, James Olson, they give Allen credit for successfully implementing that strategy and helping AT&T move forward.

"Allen is following Olson's road map, but in his own way," said Richard Toole, a vice-president at Merrill Lynch, Pierce, Fenner & Smith, Inc., a New York investment firm.

Allen was elected AT&T chairman and chief executive officer in April 1988 after Olson's death. Though Olson held the post for less than two years, he laid the groundwork for major corporate changes. One of them was a cost-cutting plan that reduced expenses by $1 billion before Allen took the helm. It will ultimately result in the elimination of 32,000 jobs from the company's payroll.

Analysts said Olson's strategy is still sound, but they added that it will benefit AT&T only if Allen can continue to implement it successfully. "AT&T has got to meet its cost-cutting projections. That's crucial," said Gregory Sawers, telecommunications analyst at Sanford C. Bernstein &

*(continued on page 14)*

PHOTO ©1989 WALTER CALAHAN

AT&T's Robert Allen

## INDUSTRY BRIEFS

**Excelan, Inc.** of San Jose, Calif., last week reported a 58% increase in net revenue and a 52% drop in net income for the first quarter, ended April 2, compared with the first quarter of 1988.

According to Excelan, net income fell primarily due to expenses related to its pending merger with Novell, Inc. ("Novell buys Excelan to extend reach," *NW,* March 27) and a shortfall in product sales to the Digital Equipment Corp. VAX marketplace.

Also contributing to the decrease, Excelan said, was a substantial sale of Apple Computer, Inc. Macintosh-related products to Novell at a near-cost price under terms of a contract signed late last year.

The local network equipment vendor reported net income of $645,000 for this year's first quarter, compared with 1988 first-quarter net income of $1.35 million. Net revenue was $20.92 million for the quarter, up from $13.28 million for the first quarter last year.

**Network Equipment Technologies, Inc. (NET)** and **Hewlett-Packard Co.** agreed last week to coordinate network repair efforts for users with equipment from both companies.

The new network support affiliate agreement calls for each company to provide the other with technical assistance in supporting user networks containing both NET and HP products. When one vendor suspects a network fault is caused by the other's equipment, it will notify the company, confirm the diagnosis and cooperate in resolving the problem.

NET, based in Redwood City, Calif., and HP, based in Palo Alto, Calif., will provide each other with training and product documentation. According to HP, the affiliate agreement "exemplifies HP's commitment to support open, multivendor networks." ◻

### RBHCs report first-quarter results

| RBHC | Earnings (In millions of dollars) | | Revenue (In billions of dollars) | |
|---|---|---|---|---|
| | 1989 | 1988 | 1989 | 1988 |
| Ameritech | $300.8 | $295.1 | $2.50 | $2.42 |
| Bell Atlantic Corp. | $348.8 | $329.1 | $2.77 | $2.63 |
| BellSouth Corp. | $449.6 | $430.9 | $3.37 | $3.20 |
| Nynex Corp. | $283.6 | $311.1 | $3.23 | $3.07 |
| Pacific Telesis Group | $317.0 | $300.0 | $2.34 | $2.30 |
| Southwestern Bell Corp. | $238.8 | $218.7 | $2.06 | $2.00 |
| US West, Inc. | $249.6 | $240.5 | $2.40 | $2.20 |

GRAPHIC BY SUSAN J. CHAMPENEY

SOURCE: RBHCS

## VANs tell users of EDI legal problems

### Conflicts could arise because current trade laws do not cover electronic business transactions.

By Bob Brown
Senior Writer

In the highly competitive value-added network (VAN) market, some companies are trying to gain an edge by helping users deal with the legal issues surrounding electronic data interchange.

Unresolved legal issues, such as who is responsible for an undelivered or garbled EDI transmission, could make upper management at some companies reluctant to use VAN-provided transmission services, industry watchers said.

While they agree that the EDI business has not been noticeably slowed by such user concerns, some VAN vendors are working to ensure EDI's continued growth by helping users understand legal issues and by promoting net security, a potential problem area.

**So far, so good**

So far, there have not been any major legal battles involving EDI. But as users electronically reach out to a growing number of trading partners, the likelihood increases that EDI will trigger a dispute between two trading partners or between a user and a value-added network provider.

The potential for an industry-shaking legal case exists because trading with electronic documents does not fall under existing laws governing trade using paper documents, said Roger Cadaret, an EDI consultant for Arthur Young & Co., a consulting firm in Detroit, and a former production control manager for EDI pioneer General Motors Corp.

Similarly, existing agreements between trading partners regarding paper-based transactions cannot necessarily be applied when the companies do business using EDI, he said.

Trading partners that rely on existing trade agreements for their EDI dealings could wind up in court if one of the parties reneges on an EDI agreement or blames a partner for lost information, Cadaret said.

**'Common and accepted'**

According to Michael Baum, president of Independent Monitoring, a Cambridge, Mass.-based EDI consulting firm, EDI has grown so fast that users and vendors never had a chance to develop "common and accepted trade practices" to use in conjunction with it.

"Now that everybody is jumping into EDI and it is mushrooming as a way of doing business," users and vendors are beginning to pay attention to related legal issues, said Baum, who is also chairman of the Electronic Messaging Services Task Force within the Section of Business Law of the American Bar Association (ABA). He is also chairman of the Legal and Control Issues Task Group of the Accredited Standards Committee X12.

> EDI grew so fast there wasn't time to develop "common and accepted trade practices" for it.

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Under the existing Uniform Commercial Code's Statute of Frauds, contracts for the sale of goods for $500 or more are unenforceable unless they are in writing and signed by the party

*(continued on page 14)*

# Before Starting Your File On Our Workstation Communications Products, You May Want To Chew A Bit On The Idea That Inspired Them.

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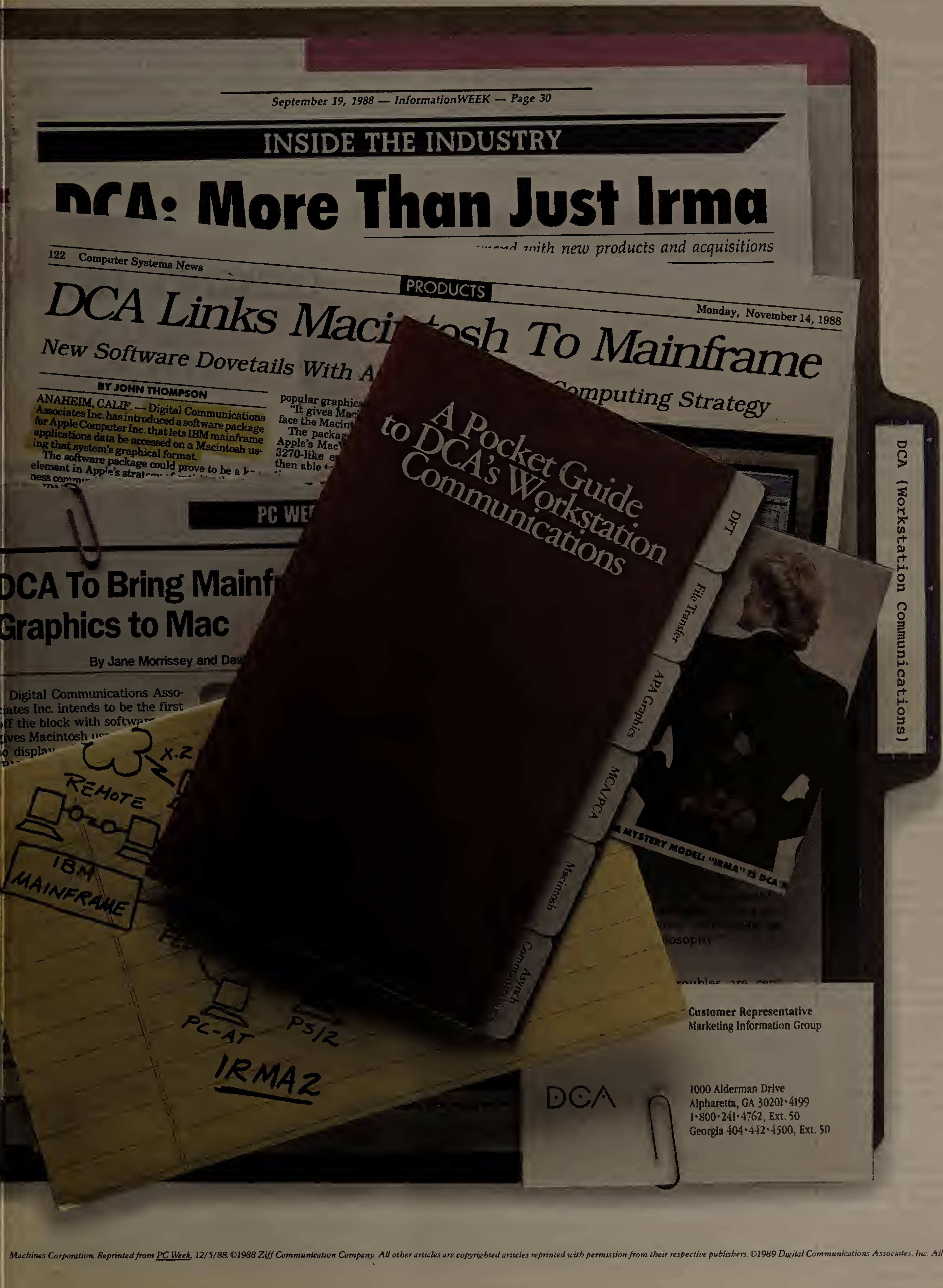
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September 19, 1988 — InformationWEEK — Page 30

INSIDE THE INDUSTRY

## DCA: More Than Just Irma

with new products and acquisitions

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122 Computer Systems News

PRODUCTS

Monday, November 14, 1988

## DCA Links Macintosh To Mainframe

### New Software Dovetails With A Computing Strategy

BY JOHN THOMPSON

ANAHEIM, CALIF. — Digital Communications Associates Inc. has introduced a software package for Apple Computer Inc. that lets IBM mainframe applications data be accessed on a Macintosh using that system's graphical format.

The software package could prove to be a k element in Apple's strat ness comm

popular graphic

"It gives Mac face the Macin

The packag Apple's Mac 3270-like e then able t

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PC WE

## DCA To Bring Mainf Graphics to Mac

By Jane Morrissey and Da

Digital Communications Associates Inc. intends to be the first off the block with softwa gives Macintosh us o displa

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## VANs tell users of EDI problems

continued from page 11

against whom the enforcement is sought.

Thus, important legal questions surrounding EDI include what constitutes "writing" and "signed" in the area of electronic documents.

A number of questions pertaining to EDI documents are being addressed by Baum's ABA group, which is developing a "model trading agreement" that is expected to be approved by the ABA sometime this summer. The agreement addresses such issues as responsibility for garbled transmissions and confidentiality of data. It is intended to provide a set of guidelines for agreements between trading partners, Baum said.

One vendor that has taken "an admirable lead" in developing the model agreement is GE Information Services, Baum said. Philip Otero, counsel to GE Information Services, sits on the ABA task force.

"User concerns are our concerns to the extent that we can make EDI an easier" way of doing business, Otero said. "We're trying to remove the obstacles."

Otero said that by participating in the development of the model trade agreement, his company is familiarizing itself with EDI issues so it can more readily answer customers' legal questions.

"We recommend, or at least I recommend, that users negotiate a trade agreement and not just a purchase order and acknowledgment," Otero said.

Upper management at companies that use EDI is concerned that EDI agreements may not be legally binding, said Tom Warner, senior business consultant at McDonnell Douglas Applied Communications Systems Co., a St. Louis-based firm that sells network application products, such as those for EDI, for use with McDonnell Douglas Network Systems Co.'s Tymnet value-added network. User concerns often focus on security issues, Warner said.

"We assure them that we can

## Allen gets high marks

continued from page 11

Co., Inc., a New York-based brokerage firm.

Thus far, under Allen's leadership, Sawers said, "it seems like they're getting there."

Audrey Stevoff, a vice-president at Duff & Phelps, Inc., an investment research firm in Chicago, credited Allen with implementing an aggressive marketing campaign that counters competitors' price attacks on AT&T.

Merrill Lynch's Toole said AT&T's advertisement shows it is "becoming more pugnacious" and leave the impression that the company is "ready to do battle."

Toole said Allen took important steps to increase AT&T's competitiveness when he authorized a $6.7 billion write-off of aging analog net equipment in the fourth quarter of 1988 and accelerated the digitization of the carrier's network.

He also cited AT&T's recent corporate restructuring, which broke the firm into smaller business units ("AT&T announces major corporate restructuring," *NW,* March 13).

Brian Moir, Washington, D.C. counsel for the International Communications Association (ICA), said AT&T has paid more attention to customers under Allen's leadership. As an example, Moir said, Allen met with ICA members after his appointment to "hear directly the concerns of users."

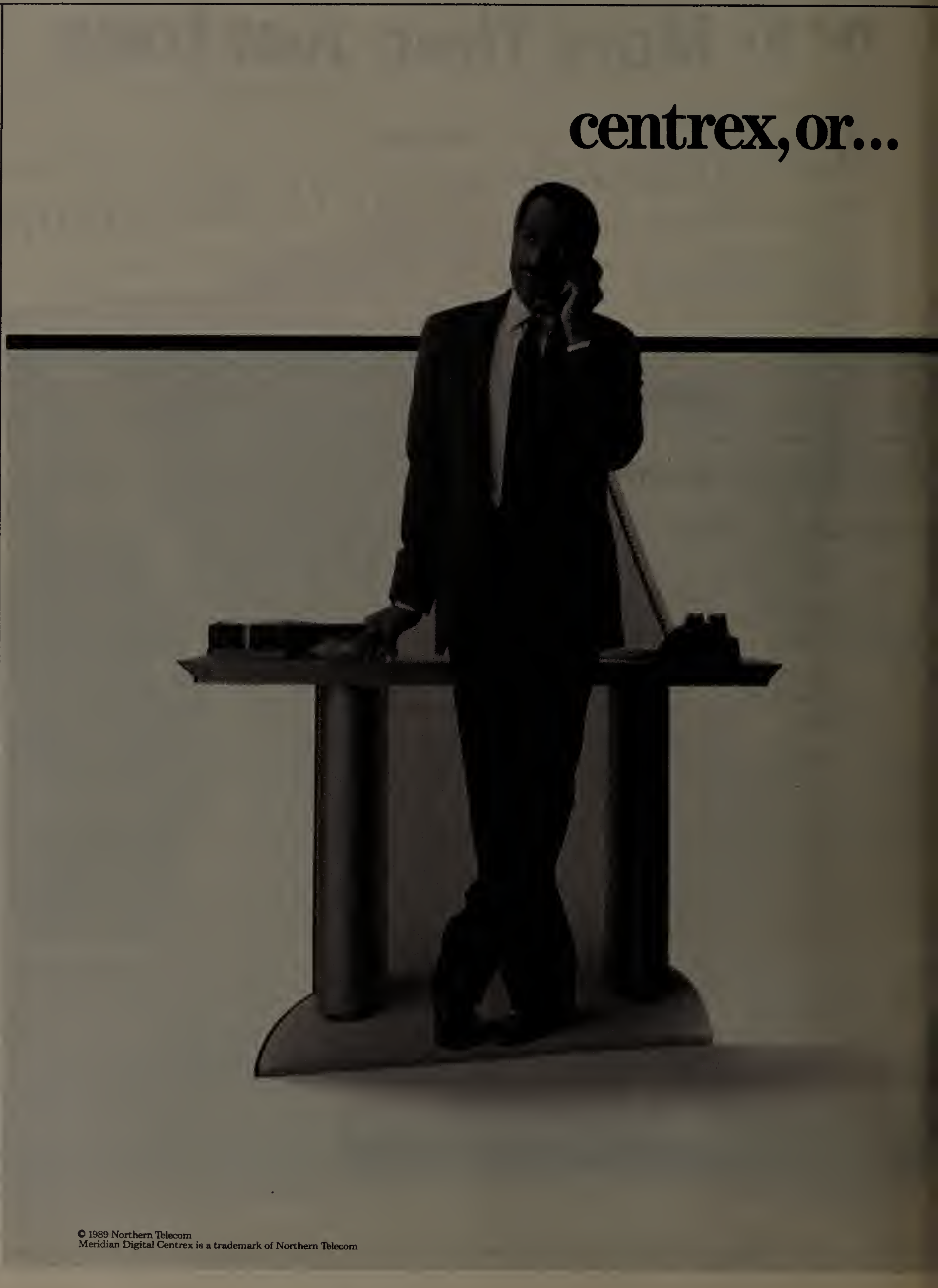
Users were concerned, Moir said, that AT&T was not doing enough to differentiate itself in regulatory matters from the regional Bell holding companies, which still have monopoly control in their markets.

That, Moir said, is an important distinction in regulatory matters such as price caps.

"Until AT&T differentiated itself from the RBHCs, there weren't going to be price caps for AT&T," Moir said.

Analysts said Allen needs to work harder at cutting costs and pursuing additional regulatory relief.

Toole said Allen must focus more attention on the company's still floundering data systems group if the unit is to become profitable next year, as the company has projected. The data systems group designs, develops and markets computers and computer networking products. ☑



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provide encryption and tell them to have their lawyers make an addendum to their existing trading contracts that addresses issues concerning electronic trading with a partner," Warner said.

"We offer our users advice," Warner said. "The person in charge of implementing EDI at a company should definitely get together with the company's lawyer before engaging in an electronic trading partnership. We tell customers that up front."

**EDI in the UK**

Users in the UK, and then the rest of Europe, may soon be relying on a type of trade agreement similar to that being drafted by the ABA, according to David Marsh, a member of the UK-based EDI Association's Legal Advisory Group and a partner in the law firm of Needham & Grant in London.

While users in the UK do not have a Statute of Frauds with which they must comply, the pressure of the common European market of 1992 looms over them. Increased intra-European trade will lead to greater need for EDI and a greater need for guidelines, Marsh said.

The EDI Association's proposed trade agreement is expected to go into effect by the fall, according to Marsh. ◪

# J.C. Penney shelves cable home-shopping network

By Sarah Vandershaf
West Coast Correspondent

DALLAS — J.C. Penney Co., Inc. has decided to scrap its Telaction Corp. subsidiary, which broadcasted an interactive home shopping service via cable television to 30,000 homes in the Chicago area.

The company decided to discontinue the network after an unsuccessful three-month search for investment partners, said Robert Gill, vice-chairman of the retailer's board of directors.

Even though Telaction had a good direct sales response rate, Gill said, "continued operation and expansion would be too costly for J.C. Penney to undertake on its own."

Telaction was broadcast over the Post-Newsweek Cable and Jones Intercable systems; it allowed customers to dial an 800 number and use their push-button telephone keypad to browse through television "catalogs."

Viewers could use their telephones to request information — such as size, color and price — on specific items and to make purchases by entering a code relating to credit card information stored in a Telaction data base.

Scrapping Telaction, which J.C. Penney launched in 1986, will cost the retailer $20 million this year. All told, J.C. Penney has invested $106 million in development of the service. Telaction's 164 employees will receive outplacement services and severance benefits, the company said.

> "Continued operation and expansion would be too costly for J.C. Penney," Gill said.
>
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The decision to stop offering the service "does not reflect a disenchantment with home shopping via cable," Gill said. J.C. Penney will continue to sell its merchandise over the Los Angeles-based Shop Television Network, a noninteractive cable service, he said.

Other major retailers, including Sears, Roebuck and Co., Spiegel, Inc. and Marshall Field & Co., also sold their wares over Telaction. Neiman Marcus had been on the net but did not renew its contract because of limitations in television technology.

"Telaction was exciting because it allowed customers a great deal of flexibility in how they looked at goods," said Clay Johnson, head of mail order sales for Neiman Marcus. "But [selling] fine-quality goods [via television] requires very fine visual reproduction, which is difficult to do on a normal low-resolution screen."

The advent of high-definition TV could alleviate this problem, he said. ◪

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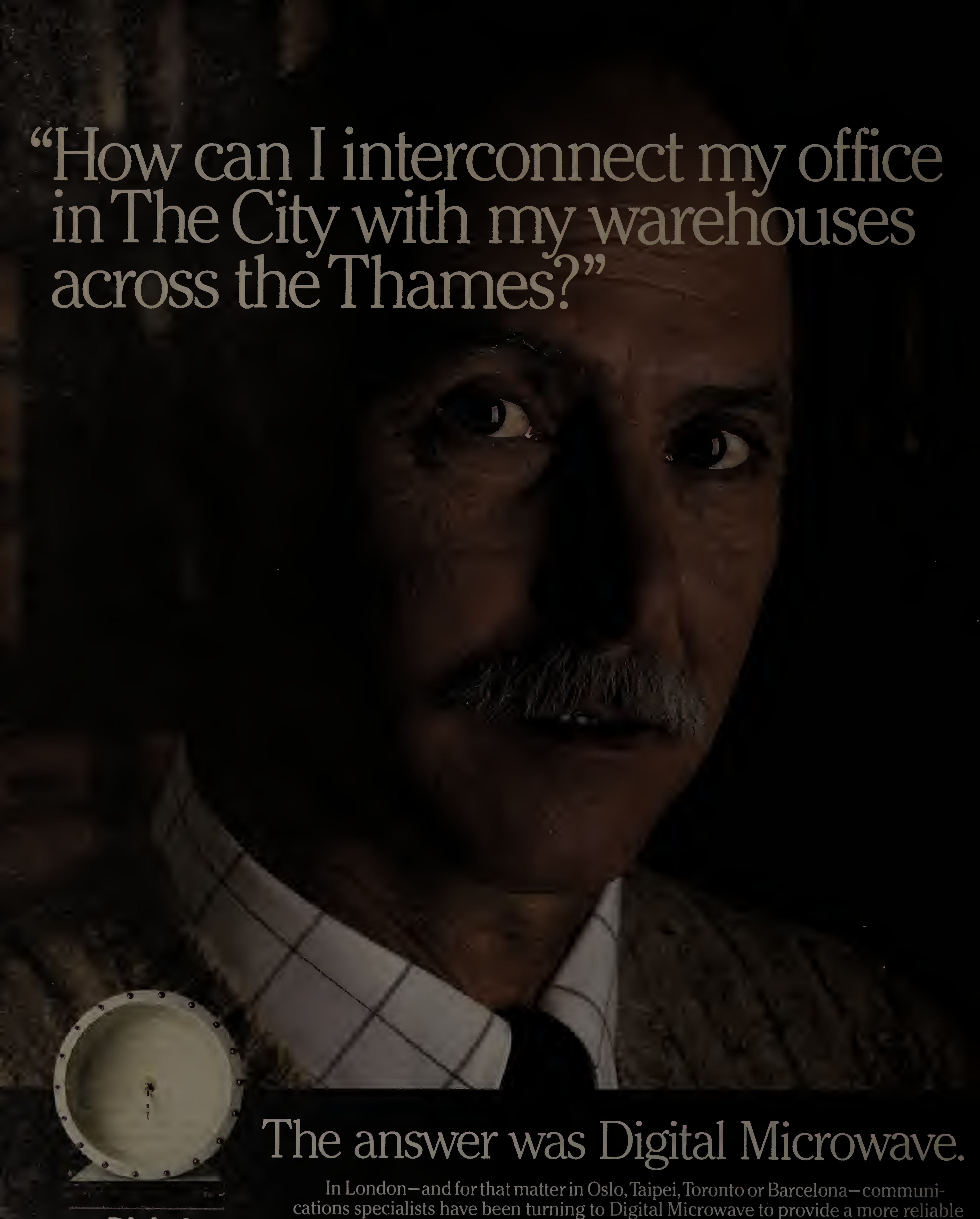

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# TELECOMMUNICATIONS

CARRIER SERVICES, CENTREX, CPE, WIRING SYSTEMS AND BYPASS

## Worth Noting

> "Successful projects have a lot of fathers. Unsuccessful projects have none."
>
> **Anonymous**

## Carrier Watch

**AT&T** asked the Federal Communications Commission last week for permission to add an intermediate data rate, 19.2K bit/sec, to its Dataphone Digital Service. The service currently supports transmission speeds up to 9.6K as well as at 56K bit/sec.

Monthly pricing for 19.2K bit/sec services will be 20% above that for 9.6K bit/sec services, AT&T said. Prices are based on a fixed monthly charge and a per-mile charge. Typical prices for a 19.2K bit/sec circuit between AT&T net serving offices less than 50 miles apart will be $87.57 a month plus $3.40 per mile. For circuits longer than 500 miles, monthly charges are $389.69 plus 38 cents per mile.

The new transmission speed will allow customers to send data at higher speeds without changing the interface to existing data communications equipment, AT&T said.

Typical applications that might use the 19.2K bit/sec service are high-speed remote printing, local networks and remote data base queries.

If approved by the FCC, the new data transmission speed will be available June 8.

**MCI Communications Corp.** signed a contract to provide voice and data communications services for The Chase Manhattan Bank, N.A. in New York. MCI said it had already been carrying some domestic and international voice traffic for Chase and that it would provide a number of data services to the bank under the agreement. Officials at the bank are trying to build a system in which any device on the net can communicate with any other device on the network worldwide, MCI said.

PBX vendors ranked by lines shipped in 1988

| Vendor | Thousands of lines shipped |
|---|---|
| AT&T | 1,060 |
| Northern Telecom, Inc. | 1,000 |
| IBM/Rolm Systems Division | 750 |
| NEC America, Inc. | 430 |
| Mitel Corp. | 410 |
| Others* | 1,160 |
| **Total** | **4,810** |

*Includes Harris Corp., Siemens Information Systems, Inc., TIE/communications, Inc. and Toshiba Corp.

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

# Hackers infiltrate voice mail system, cause chaos

Teenagers try to hold service provider hostage.

**By Paul Desmond**
Staff Writer

RICHMOND, Va. — A voice mail service provider based here recently detailed how teenage hackers tried to hold the company hostage by threatening to disrupt its voice mail system.

Although the hackers could not have disrupted the entire voice mail system of Hello, Inc., they did manage to wrest control of four mailboxes. After gaining entry to the system, they left obscene and threatening messages for about 120 Hello subscribers, causing 10 days of havoc for the company, which had to deal with complaints from puzzled and angry customers.

> The hacker called to make a prank phone call and stumbled upon the voice mailbox.
>
> ▲▲▲

Hello provides voice mail service for individuals and small companies in the Richmond area, said Doug Alexander, systems manager for the company.

The hacker nightmare started in August 1987, when, as a preventive maintenance measure, the company decided to replace the disk drive in its Centigram Corp. voice mail system. Customers' greeting messages and security codes were stored on the disk drive.

Since the system provided no means to back up the data stored on the disk drive before installing the new one, according to Alexander, Hello employees had to manually copy the greetings and reenter them after the new disk drive was installed. The company figured most customers would not notice the change since their greetings were typically recorded by Hello employees.

However, in order to get into each box to record the new greeting, Hello had to wipe out customers' security codes, Alexander said. That left the system open for anyone to call and gain access to a voice mailbox.

That is exactly what happened the day after the cutover to the new disk drive, when a teenage hacker took control of a single box. The hacker apparently called the telephone number to make a prank phone call and stumbled upon the voice mailbox, Alexander said.

Following the instructions given by the voice mail system, the hacker set up a distribution list so his obscene messages were broadcast to about 120 Hello customers, Alexander said.

In addition, the hacker told friends about his find and they secured three additional boxes, all of which were part of a group of phone numbers similar to the original box number. Besides leaving messages for one another, the intruders left messages saying they would "take over" the entire voice mail system if they were not given access to 10 mailboxes.

At that point, Hello was unaware that the hackers did not have the technical knowledge to fully disrupt the system, Alexander said.

In addition, the company was receiving numerous calls from irate customers so it called the local police, who suggested that Hello contact its local telephone company, The Chesapeake and Potomac (C&P) Telephone Co. of Virginia.

*(continued on page 18)*

# Separate backup a prerequisite for FAA

The Federal Aviation Administration splits up master contract to get best deal in each region.

**By Bob Wallace**
Senior Editor

WASHINGTON, D.C. — Determined to shield itself from crippling service outages that could endanger air travelers, the Federal Aviation Administration is calling for redundant transmission facilities in its planned $400 million air traffic control net.

Diversely routed backup links will improve network availability and help prevent the recurrence of the one or two outages the FAA sustained last year, which the agency said were one or two too many.

The FAA has broken the master contract for the net into 20 smaller contracts, each of which is being bid on individually. The contracts are for both intra- and interlocal access and transport area links tying plane tracking and air-to-ground communications systems to Air Route Traffic Control Centers (ARTCC).

AT&T Federal Systems has already won two of the 20 ARTCC contracts, serving Denver and Boston, with the remainder due to be awarded over the next two years. AT&T says the contracts will represent $37 million in revenue. In both cases, the Bell operating companies in those areas won the intra-LATA part of the contracts.

Although the FAA plans to have backup facilities for all intra- and inter-LATA links, it still plans to cut costs as much as 20% by replacing old voice-grade private lines predating divestiture with links acquired through competitive bidding.

Issuing each bid separately will enable the FAA to select the bidder with the strongest regional network presence, best support and lowest priced services, the FAA said. Only carriers that offer completely separate backup lines for the routes specified can win an ARTCC contract.

"The critical nature of the communications on the network means we have to have at least .99999 service availability," said Michael Gariazzo, telecommunications manager for the FAA.

"In some cases, a single thread connects our facilities to the local central office. We've had situations in the past where backhoes dug up and snapped these lines," Gariazzo recalled. Loss of those lines can cut off an ARTCC from the rest of the network.

Ground-to-air communications is typically handled by the

*(continued on page 18)*

## WASHINGTON UPDATE

BY ANITA TAFF

**AT&T calls claims 'baseless.'** AT&T told the Federal Communications Commission last week that allegations made by three competitors against its Federal Telecommunications System (FTS) 2000 tariff were "entirely baseless." Earlier this month, MCI Telecommunications Corp., Martin Marietta Corp. and Williams Telecommunications Corp. asked the FCC to reject AT&T's Tariff 16 filing for FTS 2000 on the grounds that it was priced below cost and discriminated against other users.

MCI, Martin Marietta's partner in its losing bid for FTS 2000, claimed that AT&T is planning to charge the government only 5 cents per minute for switched voice services — a price MCI claims will fail to recover costs. MCI also alleges that in order to make the FTS 2000 services appear to recover costs, AT&T underestimated many costs associated with the contract.

AT&T, in a formal response to the allegations last week, told the FCC it had fully reported all costs and that the service will make money. Costs for billing, collection and bid preparation are included in the tariff, AT&T said, but are contained in other expense categories and therefore do not show up as separate costs. AT&T admitted its tariff reflects lower access costs than would normally be expected. But it said that due to the network architecture that will be used to support FTS 2000, access charges can be minimized. AT&T did not respond to MCI's assertion that switched voice services under FTS 2000 will be priced at 5 cents per minute.

## Hackers infiltrate voice mail system

continued from page 17

After discovering the home telephone number of one of the teenagers from a message left on the system, C&P Telephone of Virginia monitored the number and recorded each number dialed from it, Alexander said.

Besides calls placed to Hello voice mailboxes, C&P Telephone of Virginia discovered several calls to an MCI Communications Corp. access number. C&P Telephone of Virginia officials believed the hackers had access to stolen MCI calling card numbers, so they contacted the Secret Service, which has jurisdiction in interstate telecommunications fraud, Alexander said.

By that time, two days after the incident started, Hello had finished calling its customers to tell them to install new pass codes on their boxes. For customers it could not contact, Hello placed its own codes on their boxes, recorded them, and waited for the owners to call with complaints, at which time they were given their new pass code.

As for the hackers, only one was positively identified. Since he was a minor, Hello opted to have the police warn the youth and inform his parents rather than prosecute.

Maintaining security codes on all boxes at all times is now a priority for Hello. "We're very much on top of making sure that all voice mail boxes have a pass code now and making sure they stay there," Alexander said. ◼

## Telemanagement systems vital for keeping a handle on costs

*First of two parts.*

**By Ricardo Brutocao**
Special to Network World

In the ongoing battle to control and reduce telecommunications costs, the telecommunications manager's chief weapon is a telemanagement system capable of generating management reports and tracking events and costs.

Telemanagement systems can track everything from call cost by extension to trend data that might influence reconfiguration plans or equipment buying and selling decisions.

The question is not whether the user should use a telemanagement system, but rather, which approach to take. There are only two real alternatives: install telemanagement software on a company personal computer, minicomputer or mainframe, or use a service bureau.

*Brutocao is president of Account-A-Call Corp., a Burbank, Calif.-based vendor that licenses call-accounting software for independent use and operates call-accounting service bureaus.*

## Separate backup a prerequisite for FAA

continued from page 17

airport's control tower until the plane is 50 miles away. After that, voice communications is passed from ARTCC to ARTCC until the flight comes within 50 miles of its destination, when the destination airport tower takes over.

"Our air traffic control network is more regionalized than national in nature, with 20 star networks — one for each ARTCC. The star networks are interconnected with [low-speed] private lines," Gariazzo said.

Each ARTCC serves as a hub of the star network, with voice-grade private lines supporting the surrounding search radars, which track where the plane is, and radio transmitters and receivers that handle ground-to-air communications, Gariazzo said. This equipment may be located as much as 200 miles away from the ARTCC.

In the first two FAA contracts, AT&T will connect these devices to the Denver and Boston ARTCCs using a mix of digital microwave and private fiber-optic cable, Gariazzo said.

The FAA decided on the piecemeal approach to issuing contracts because the voice and data traffic around the 20 regional ARTCCs is far heavier than communications between these sites.

Under the AT&T plan, channel banks installed at the customer's premises will be linked with two T-1s, one primary and one backup, to AT&T central offices. A device called an automatic protection switch, located in the AT&T central office, will monitor the main T-1 and instruct the channel bank to switch to the backup if line quality degrades or the link is lost.

The channel banks can switch to the backup T-1 in less than a second, an AT&T Federal Systems spokeswoman said.

Although the channel banks are part of the network service offered under AT&T's Tariff 9, the backup link costs extra, but it is less than the cost of the primary circuit, AT&T said.

The Denver site is proceeding as scheduled and will be operational in a few weeks, according to AT&T. The Boston facility is still in the planning stages.

Contracts for 18 additional sites are still to be awarded. These sites include Atlanta, Chicago, Cleveland, Dallas/Fort Worth, Houston, Indianapolis, Kansas City, Los Angeles, New York, San Francisco and Washington, D.C.

AT&T already provides almost all of the FAA's dedicated transmission links and, therefore, stands to lose the most if rivals capture any of the remaining contracts, Gariazzo said. ◼

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With IBM's voice response unit, customers can access your computer data base with their telephone without operator assistance. They can call in and place orders or get information simply by pushing buttons on their phone.

With either approach, the call management process begins with the collection of call data. Data can be gathered directly on magnetic media obtained from the telephone company for Centrex systems or captured through the use of a polling device connected to the private branch exchange.

Once collected, the data is transferred to a computer for processing. The telemanagement software organizes, sorts, estimates prices and analyzes the data, and it produces a series of management reports.

Call-accounting systems can be used for several critical functions, including allocating costs to extensions, cost centers or departments; evaluating alternatives to WATS, tie lines and foreign exchange lines; and obtaining the optimal mix of telephone service based on current telephone traffic patterns.

Knowing what information is needed, the telecommunications manager can focus on the most effective means of delivery. If management wants an instant handle on telephone activity, with reports available on demand, in-house processing is the best bet.

The telephone system asset can be managed on a monthly basis.

Sometimes, however, the telecommunications asset is better managed in a manner similar to the way telephone companies do billing, that is, monthly.

In such a case, service bureaus can provide timely reports generated from the most current tariff data. Service bureaus can often deliver capabilities not readily available on in-house systems, such as sophisticated laser-generated graphics, high-speed tape output and unusually large-capacity disk storage.

The advantages of in-house processing include:

- Spontaneous data base modification, in which changes to the data base can be reflected immediately in reports.
- Report selectivity, which allows users to format their own set of reports.
- What-if scenarios, in which, at the discretion of management, different scenarios can be analyzed for pricing, line usage and long-distance carriers.

It is important to consider where the computer is located in relation to the switch when considering the in-house method. The software should be capable of polling remote devices; if it can't, the processing computer may have to be situated in uncomfortable proximity to the PBX.

If the in-house option is selected, users must also consider what computer and operating system will run the software. Should the MIS department's mainframe or minicomputer be used? Or a dedicated telecommunications department computer? Or a stand-alone or networked personal computer?

When selecting the computer, the user must identify the type and volume of calls, the number of locations (unique PBXs to be monitored), the number of telephones in the organization, the expected number of calls per station, and the quality and quantity of reports the telemanagement system must generate.

As a rule of thumb, when volume exceeds 500,000 calls per month, a mainframe with substantial on-line disk storage should be considered. For lower call volumes, a smaller computer is adequate.

The choice of computer may dictate the selection of the telemanagment software product. If the MIS department's computer is to be used, the software selected must be compatible with the operating system on that computer.

It is also important to examine carefully the way the telemanagement system is written. Sometimes, software that seems ideal during a demonstration may become a dog when it is run in a real-world environment, especially in situations involving high call volume. The best bet may be to test the software using a call record file similar in size to what is expected in a regular processing cycle.

When volume exceeds 500,000 calls per month, consider a mainframe with substantial on-line disk storage.

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### Cost factor

In-house telemanagement software that runs on personal computers may be priced from a few hundred dollars to as much as $40,000. Software that runs on minicomputers and mainframes can range from $10,000 to more than $250,000.

Additional costs associated with setting up an in-house telemanagement function include training, software maintenance, supplies, and personnel expenses for running the program and keeping tariffs and configurations current.

The critical question of who will actually run the telemanagement system must also be considered. For example, if the mainframe is to be used, where does telemanagement fit into the MIS department's priorities? Will telemanagement receive the priority consideration it merits?

If the user decides to go with a departmental computer or personal computer, who in the department will be assigned responsibility for making sure that data is current, changes are entered and reports are run? A backup person should be designated to cover on those occasions when the primary individual is ill, on vacation, or worse, resigns.

*In Part 2, Brutocao discusses the merits of call-accounting service bureaus and delineates issues that users should consider before making a final decision.*

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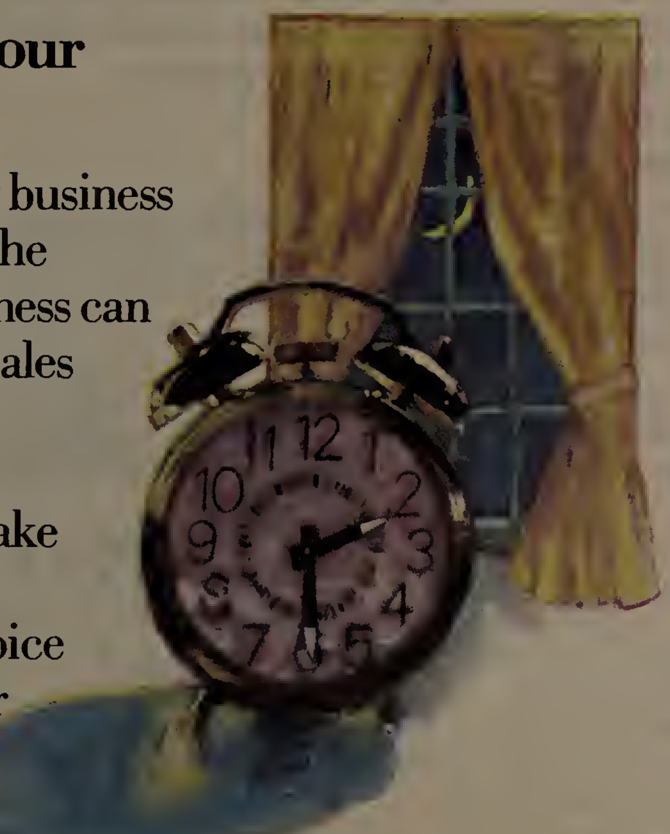

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## Worth Noting

"All these vendors [supporting OSI net management] must realize that this type of [integrated] network management was required yesterday. OSI is not here today, nor do I expect it to be here for several years."

**Douglas Weber**
Systems manager
Southwestern Bell
Telephone Co.
St. Louis

## Data Packets

**Develcon Electronics, Ltd.** announced last week a new product family that links users on local networks with users on Integrated Services Digital Networks.

The new I-Gate 8000 Series products can lower the cost of using ISDN services by cutting the number of physical interfaces needed between data processing equipment and the ISDN switch, according to the announcement.

The base unit is the Model 8010, which supports up to 64 modems or computer ports running at speeds up to 38.4K bit/sec. These channels are multiplexed onto a single 64K bit/sec connection to the ISDN switch.

The Model 8011 supports a network interface card that attaches the controller to an IEEE 802.3 Ethernet local network running the Transmission Control Protocol/Internet Protocol.

The Model 8014 incorporates a line card to support data conferencing for as many as 12 ISDN subscribers with personal computers or terminals.

The I-Gate 8000 series products are available now. Pricing for the different models ranges from $4,500 to $20,000.

Develcon can be reached by writing to 515 Consumers Road, Suite 500, Willowdale, Ont., Canada M2J 4Z2, or by calling (416) 495-8666.

# DEC pushes existing net mgmt. in DECnet

### Firm promotes net control tools already built into DECnet for users impatiently awaiting new EMA.

By John Cox
Senior Editor

FRAMINGHAM, Mass. — Criticized by some for trailing rivals in integrated network management products, Digital Equipment Corp. has been reminding customers of the net management tools built into its DECnet architecture.

These tools are enabling customers to handle a wide range of net management tasks while they wait for DEC to release products supporting its Enterprise Management Architecture (EMA), according to DEC officials. EMA is DEC's network management blueprint for multivendor environments.

DECnet software running on VAXes in a network contains programs for monitoring nodes, collecting statistical data and running performance and diagnostic tests. These functions can be performed from any terminal or workstation on the network.

The tools are versatile enough to permit customers to manage relatively sophisticated DECnet networks of 50 to 100 nodes without buying any separate network management packages, according to William Gassman, DEC's marketing manager for network management products.

And they're valuable enough to be retained, with some changes, when EMA arrives, he said.

The DECnet net management programs collect data, which experienced operators can weigh and interpret, from DECnet nodes. EMA products, by comparison, will collect data from both DEC and non-DEC devices, store the information in a data base and enable users to manipulate it with an array of specialized applications accessed by a common graphical user interface.

User-friendliness, in fact, is one of the features missing with the current DECnet network management products. "If you

(continued on page 26)

# The Library of Congress preps early OSI network

By Laura DiDio
Senior Editor

WASHINGTON, D.C. — The Library of Congress is planning to migrate its Open Systems Interconnection-based network to the full OSI standard by 1990, making it one of the first government networks to fully support the standard.

The library's current mainframe network, which has been in operation since 1985, combines vendors' OSI products for lower layer OSI network requirements with upper level software developed by the library and two of the country's largest bibliographic utility companies.

The network is used to share card catalog data and transmit search requests to the Research Libraries Information Network (RLIN) in Mountain View, Calif., and the Online Computer Library Center (OCLC) in Dublin, Ohio. RLIN and OCLC are bibliographic utilities that maintain data bases in the same way the Library of Congress does.

The network also supports independent libraries that use leased and dial-up lines to tap into the data bases.

Before the library built the network, there was no way for the three data bases to communicate, according to Larry Dixson, a senior network specialist at the Library of Congress.

The library, RLIN and OCLC each had different mainframes, their data bases were all structured differently and they used disparate telecommunications access methods, Dixson said.

After deciding OSI was the best way to link the computing resources and after settling on a basic network scheme, the library and the companies agreed to write their own upper level network software based on the OSI specifications that existed at the time. "There were no commercially available OSI upper level products when we were building the net," Dixson said.

Now the library wants to be fully OSI compliant. Over the next 18 months, the library plans to migrate to IBM's OSI/Communications Subsystem (CS) suite of OSI products, according to Ray Denenberg, a senior network specialist at the library. OSI/CS, announced last September, is ex-

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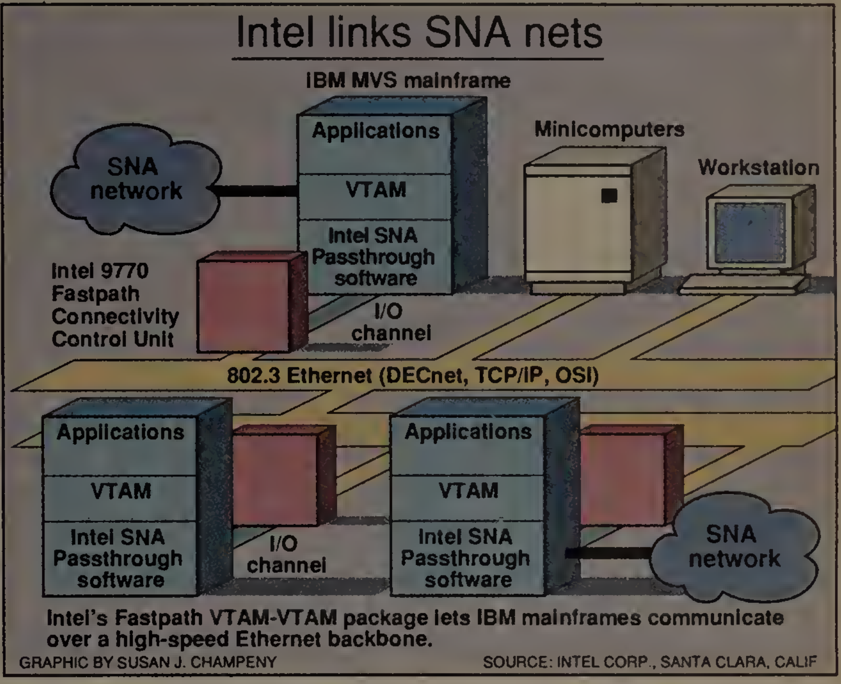
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I/O channel
Applications
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Intel SNA Passthrough software
SNA network

Intel links SNA nets

Intel's Fastpath VTAM-VTAM package lets IBM mainframes communicate over a high-speed Ethernet backbone.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: INTEL CORP., SANTA CLARA, CALIF

# Intel unveils pack that lets mainframes talk via E-net

### Provides a high-speed alternative to FEP links.

By Paul Desmond
Staff Writer

PHOENIX — Intel Corp. last week announced Fastpath VTAM-VTAM, a hardware and software package that lets IBM mainframes communicate over Ethernet local networks.

The product gives users a low-cost, high-speed alternative to linking mainframes using front-end processors. Fastpath VTAM-VTAM and a 10M bit/sec Ethernet can support applications such as file transfers at 14 to 28 times the speed of 56K bit/sec front-end processor links, according to Maurice Voce, marketing manager for Intel's Systems Interconnect Operation, based here.

IBM Systems Network Architecture data traffic can be transported across an Ethernet supporting Digital Equipment Corp.'s DECnet, Transmission Control Protocol/Internet Protocol or Open Systems Interconnection protocols.

The Fastpath VTAM-VTAM package includes the 9770 Fastpath Connectivity Control Unit processor, which is the hardware that provides the mainframe-to-Ethernet interface, Voce said. It also comes with Intel's new SNA Passthrough software, which runs on IBM System/370 mainframes as a VTAM application.

SNA Passthrough takes SNA messages from VTAM and hands them off to the Fastpath control unit, said Mark Smith, network product line manager for Intel's Systems Interconnect Operation. The control unit encapsulates SNA data coming from one mainframe in OSI packets for transport over Ethernet, Smith said.

After they arrive at their destination, a second Fastpath processor strips the OSI transport protocols before sending the data to the mainframe.

"You have two mainframes thinking they're talking in an SNA network, but they're really talking over an Ethernet network," Voce said.

Since data is encapsulated on the Fastpath processor, it does not sap mainframe CPU cycles, Smith said.

The product supports SNA LU 0, 1, 2, 3, 6.1 and 6.2, and it does not require mainframe operating system changes or VTAM application changes, Voce said. The interface between the Fastpath processor and VTAM is direct and does not require a Sessions Services Control Point session, as do front-end processors, Smith said. That feature is another factor that contributes to the performance of the VTAM-VTAM product.

SNA data traffic can be transported across an Ethernet supporting DECnet, TCP/IP or OSI.

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### Applications

Applications for the product include bulk file transfers, which are typically run on a channel-to-channel link between mainframes.

"You'd see two or three times the performance in bulk file transfer" with Fastpath VTAM-VTAM, Voce said. "Ethernet is much more suited for bulk file transfer than a telecommunications link at 56K bit/sec."

A second application is in

(continued on page 22)

# Library of Congress preps early OSI net

continued from page 21

pected to be available in early 1990.

"Compliance with the International Standards Organization's seven-layer OSI model means that network users will only have to learn a single common set of commands to run search applications, request interlibrary book loans or order library materials," Dixson said. "This, in turn, means that users get the information more quickly, and it dramatically cuts down on duplication of effort."

The library also will be fully compliant with the Government OSI Profile (GOSIP), Dixson said. Beginning next year, GOSIP will become a federal standard, and all new government contract proposals currently specify compliance with GOSIP.

The network today is based on X.25 packet-switching services provided by Telenet Communications Corp. The net links the library's Amdahl Corp. 5890/400E IBM-compatible mainframe with Data General Corp. minicomputers and Amdahl machines at RLIN and OCLC.

Bibliographic utility companies such as RLIN and OCLC charge libraries annual fees to access their data bases for cataloging purposes. Member libraries can also take advantage of such services as interlibrary book loans and ordering of library materials.

Before the net was installed, libraries had to type out "name authority records," which contain the preferred version of the author's name and any variations, and mail them to the Library of Congress. The library would then manually input the data after searching its data base to determine whether the record already existed.

In the mid-1970s, an automated national name authority data base was created that enabled individual libraries to submit data on Machine Readable Cataloging (MARC) tapes, which were loaded into the Library of Congress, RLIN and OCLC mainframe data bases. RLIN and OCLC also participated in the project, copying the Library of Congress' MARC files onto their mainframe data bases.

"Once we had the automated data bases, we knew as early as 1982 that we wanted to build an OSI net to let libraries access and share records," Dixson said. But, although ISO began work on the OSI reference model in 1978, the standards were not yet defined.

By 1984, though, the protocol specifications for the first five layers of the OSI model were standardized and the Library of Congress was able to build its network to be OSI-compliant at these levels.

**A real time-saver**

"The network has enabled the Library of Congress to dramatically reduce the time it takes to establish name authority records and cut down on the amount of record duplication by large university, research and public libraries," Dixson said.

"We automated our manual processes and moved to OSI at the same time," he said. "The combination made our operation more efficient and enabled network users to share and access data faster than we could ever do before."

The X.25 component of the network satisfies the first three layers of the OSI model, providing the physical, data link and routing capabilities necessary to provide connections between systems on the network.

The library's OSI equipment includes a DG Eclipse C/330 minicomputer, which acts as the library's front-end processor in Washington. It also includes other DG equipment.

"We chose DG because they were one of the few vendors in 1982 that had OSI-compliant X.25 software that was also certified by Telenet," Denenberg said.

At the OSI model's fourth and fifth layers (transport and session), which define the software protocols for transmitting data and establishing connections, the library still uses its own in-house software, but it fully complies with the OSI standards, Denenberg said.

The sixth and seventh layer protocols, which provide a standard method to exchange data between applications running on remote systems on the network, are also based on in-house software written by the Library of Congress, RLIN and OCLC. That software is not OSI-compliant.

The library is currently using the ANSI-approved Z39.50 specification to search remote data bases and retrieve records. To perform file transfers, the library, RLIN and OCLC are currently using the Record Transfer Protocol, which they developed themselves, instead of File Transfer, Access and Management (FTAM) to transfer records and files. "We'll either push for it to be standardized or we may switch to the ISO-approved FTAM standard," Dixson said. ◘

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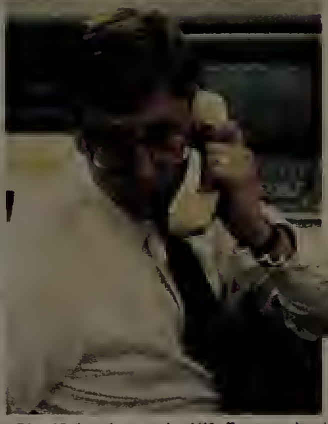

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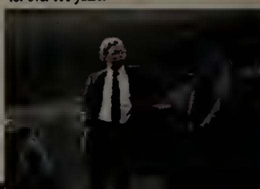

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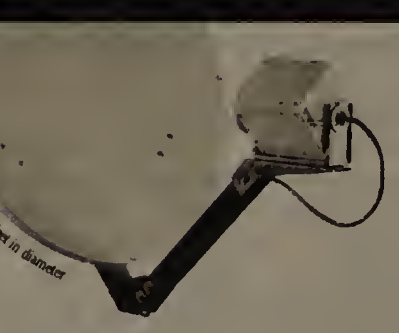

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# Pack lets mainframes talk via Ethernet

continued from page 21

campus environments that have one SNA network and a separate stand-alone IBM mainframe. The two machines could be linked via Ethernet for a fraction of the cost of installing a front-end processor and telecommunications lines, Voce said, giving all the users access to the applications on the SNA network.

"We're finding that most major companies have Ethernet installed," Voce said. "We're allowing them to utilize that Ethernet network to transport SNA traffic."

The Fastpath VTAM-VTAM application kit, available now, costs $125,000 and includes the equipment required to connect two mainframes. For more information, contact Intel at 3065 Bowers Ave., P.O. Box 58065, Santa Clara, Calif. 95052, or call (408) 765-8080. ◘

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# DEC pushes net mgmt. in DECnet

continued from page 21

know how to use them and have a lot of experience with them, they probably are adequate," a VAX manager at a large Midwestern state government agency said privately. "But they are not made for an entry-level operator."

Nor were they designed for ease of use, according to Stuart Wecker, one of DECnet's principal architects and president of data network consulting firm Interface Design, Inc. in Sudbury, Mass. While DECnet was created with built-in management capabilities, DEC never created an easy-to-use interface for the tools, Wecker said.

The core of DECnet's management capabilities is the company's Network Control Program (NCP), called a director, which uses DEC's proprietary Network Information Control and Exchange protocol to talk with agents, or programs, on other nodes.

One key agent on every DECnet node is the Network Management Listener (NML), which listens for NCP inquiries regarding information such as node names and addresses or parameters such as buffer sizes. The NML processes the inquiry and sends back a response.

Other net management programs include Mirror and Network Event Logger.

Mirror accepts connection requests from a remote NCP and reflects back, or echoes, whatever data the NCP sends. Customers can use Mirror to confirm connections and verify that data is being sent accurately through all seven layers of the DECnet architecture, according to Gassman.

The Network Event Logger tracks roughly a thousand different types of events, such as passwords and DECnet nodes coming on-line. The Logger can display events on a local console, store them in a log file or pass them to a local application for processing. The Logger can also send its data to another node, where it can be handled in the same fashion.

Two companion programs measure network performance. DTSEND and DTRECV enable an operator to measure transmission speed by sending test data from one system to another as quickly as possible. At the end of a set time period, the operator can see, via the NCP, the number of packets sent and received as well as the bit/sec throughput rate.

## Counter culture

Customers realize tangible benefits from combining built-in features with a distributed management architecture, according to Wecker. "They have tons of network management capabilities," he said.

**DEC's William Gassman**

As an example, he cited DECnet's ability to handle errors at two levels. For noncritical conditions, such as transmission noise problems, DECnet can run a series of event counters to record how often a condition is occurring. "You can see in the buffer overflow counter when your buffer pool is getting depleted too often and then change the [buffer] size," Wecker said.

For critical errors such as circuit failures, the NML generates an alarm and sends it to a predetermined console or application, he said. DECnet's single greatest network management feature is its error counters, but they must be read on a regular basis and carefully interpreted to derive the maximum value, according to the user from the state agency.

In a recent incident, one counter was recording what is known as a heartbeat problem — thousands of failures in less than an hour. From the pattern, the manager concluded that the problem was either a faulty Ethernet transceiver or the wrong type of transceiver. A check by an operator showed it was the latter. ◻

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## Worth Noting

"We have no conflict supporting both NetWare and OS/2 LAN Manager. NetWare appeals to general-purpose PC users, while LAN Manager Unix is characterized by multiple users with dumb terminals working interactively to share the same data base."

**Ron Stanczak**
Assistant vice-president
PC Division
NCR Corp.
Dayton, Ohio

## Netnotes

**Sytek, Inc.** recently introduced an IBM-compatible 4M bit/sec token-ring adapter that lets users connect up to 260 personal computers on a single token-ring net.

The Sytek 6140 Token-Ring Network Adapter Card supports IBM's PC LAN Program, Novell, Inc.'s NetWare and Microsoft Corp.'s OS/2 LAN Manager network operating system.

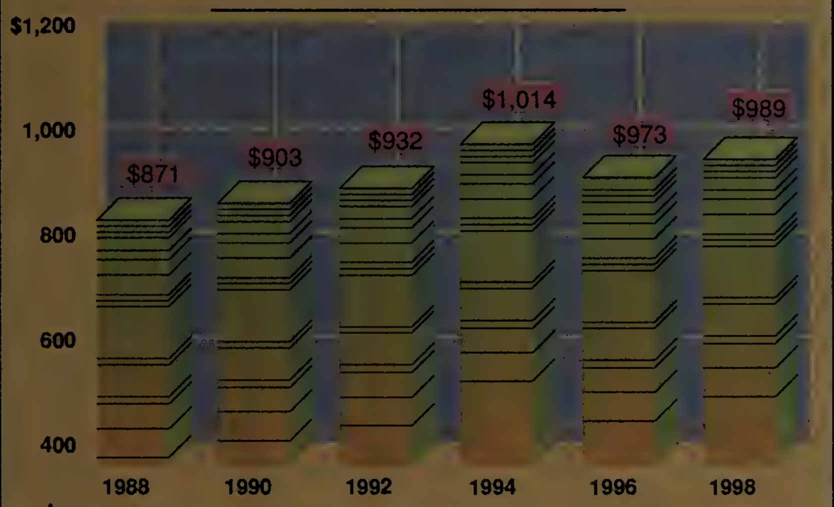
The adapter runs on IBM Personal Computers, ATs, XTs and compatibles as well as on Personal System/2 Models 25 and 30. It has 128K bytes of random-access memory and 32K bytes of buffer memory, and it supports both IBM Type 1 and Type 3 cabling, said Phil Edholm, Sytek's director of marketing.

To provide users with a Network Basic I/O System application program interface, the adapter incorporates Sytek's version of IBM's NETBIOS Extended User Interface protocol, Edholm said.

Additionally, the 6140 adapter supports 3270 terminal-emulation sessions and an IBM Advanced Program-to-Program Communications interface from the data-link layer to the application layer of the Open Systems Interconnection model.

*(continued on page 30)*

LAN connection costs



▲ Average cost of a LAN connection

The average cost per local network connection will rise 1.3% per year through 1994. In 1996, the cost will begin to decline slightly due to rising demand.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: BUSINESS COMMUNICATIONS CO., INC., NORWALK, CONN.

# Social Security links up nationwide E-mail network

### Net will incorporate personal computers, LANs.

**By Susan Breidenbach**
West Coast Bureau Chief

WOODLAWN, Md. — Using personal computers and local networks, the Social Security Administration (SSA) is linking some 1,700 sites nationwide in what will be the federal government's largest civilian electronic mail network.

Local nets at 16 regional centers around the country will serve as store-and-forward hubs for the 1,700 SSA sites. Initially, the network will deliver E-mail to about 20,000 SSA employees who use the agency's approximately 6,000 personal computers.

"We expect to add another 40,000 users in the next three years," said Judy Schneider, marketing director for Vienna, Va.-based Advanced Technology Systems, Inc. (ATS), a systems integrator that is building the E-mail network.

Only about 80 SSA sites have local networks; other sites use stand-alone personal computers shared by multiple users. The stand-alone systems will be running cc:Mail, Inc.'s cc:Mail Remote software, which will let them act as dial-up clients to the cc:Mail servers at the hub sites.

The network, which will cost $1.58 million, includes a site license for the cc:Mail software.

Schneider said ATS chose cc:Mail Remote for the SSA network because it has features that are useful in a large, widely dispersed E-mail network.

The cc:Mail software is based on a distributed architecture in which the processing is done at the client workstations. The server is used only as a file cabinet to store the message and directory data bases. This results in minimal server overhead and allows for the creation of larger nets.

Also, cc:Mail Remote has an efficient communications protocol that can push high-speed modems close to their maximum transmission rates. This is important in wide-area E-mail networks that rely on dial-up connections.

Another factor in the software's favor was cc:Mail's willingness to extend the single-site license to other government agencies that SSA employees deal with frequently.

"For example, if a certain SSA office is in constant communication with a local welfare office, the terms of the site license allow the SSA to provide that outside agency with a copy of cc:Mail," Schneider said.

When the network installation is completed, which is expected by September, each SSA site will be equipped with a 2,400 bit/sec Hayes Microcomputer Products, Inc. modem that will transmit compressed and encrypted cc:Mail Remote messages over dial-up lines to file servers at the 16 hub sites. The file servers will then sort messages and forward them to receiving sites via dial-up lines and 9.6K bit/sec U.S. Robotics, Inc. modems.

Forwarding will be done in batches twice a day so there will be a delay of several hours between the time a message is sent and the time it is received by its addressee.

However, waiting several hours for information is infinitely preferable to the days or even weeks it takes for messages and data to get from one site to another via regular mail, said one SSA official.

Each hub file server is a self-contained, bus-based local network running Novell, Inc.'s NetWare. This so-called "LAN-in-

*(continued on page 30)*

# Token ring ties MIT Ethernet local nets

### ProNet-10 backbone gives university flexibility to connect 20 LANs across its 1½-mile campus.

**By Laura DiDio**
Senior Editor

CAMBRIDGE, Mass. — While the Massachusetts Institute of Technology is a major user of Ethernet, it relies on a token-ring backbone network to link more than 20 Ethernet local networks throughout its campus here.

MIT currently boasts one of the largest campus networks in the U.S., according to both its own estimates and figures supplied by International Data Corp., a market research firm in Framingham, Mass. It has 23 Ethernets supporting 2,500 computers in some 50 buildings on campus.

When MIT decided to install a backbone network in 1984 to link the Ethernets, it chose Proteon, Inc.'s ProNet-10, 10M bit/sec fiber-optic token-ring network because it could support a greater network distance than an Ethernet backbone.

While an Ethernet backbone might have seemed the obvious and logical choice for linking the local networks, Ethernet's distance limitations would not have allowed MIT to network the entire campus, according to Jon Rochlis and Ron Hoffmann, assistant network managers at MIT.

"The ProNet-10 token ring was the only product available in 1984 that would let us traverse the entire mile and a half distance of the campus," Hoffmann said. "At the time, Ethernet bridges didn't exist, and even if they had, they wouldn't afford us the fault isolation capabilities that we get from internetwork routers."

**Inside the network**

MIT's current network setup hasn't changed much since 1984, Rochlis said.

Digital Equipment Corp. MicroVAX II machines running MIT-developed internetwork routing software are used as gateways linking Ethernets to the token-ring backbone, he said. Like many government and academic institutions, MIT uses the Transmission Control Protocol/Internet Protocol.

"The ProNet-10 backbone has been more than adequate to serve our needs, despite the fact that the network has grown quite a bit

*(continued on page 30)*

# *Datamedia's Netmate line boosted by 386SX support*

**By Susan Breidenbach**
West Coast Bureau Chief

NASHUA, N.H. — Datamedia Corp. recently added a workstation based on Intel Corp.'s 386SX microprocessor to its line of Netmate PC/Workstations for DECnet local networks.

The Netmate/SX offers users one of the smallest desktop enclosures of any 386SX-based workstation currently available for Digital Equipment Corp.'s DECnet environment, Datamedia said. It comes with a built-in Ethernet port, a DEC-compatible keyboard, enhanced graphics and terminal-emulation software.

The Netmate/SX employs the 386SX, a hybrid microprocessor that combines the 32-bit internal architecture of Intel's regular 80386 microprocessors with the 16-bit external data bus of the 8086 and 80286 chips.

The workstation also supports Datamedia's Neterm terminal-emulation software, which contains a cut-and-paste utility that lets users move screenfuls of data from a VAX file to a DOS application, and vice versa.

The software also supports enhanced graphics displays with resolutions of 800 pixels by 400 pixels in 16 colors.

Securecard, a magnetic disk the size of a credit card, contains the booting firmware for diskless workstations.

Versions are available for Novell, Inc.'s NetWare, Sun Microsystems, Inc.'s PC/NFS and DEC's Personal Computer Systems Architecture. The same Netmate node can be switched from one of these network environments to another by removing one Securecard and rebooting from another.

The Securecard can also be used to restrict access to the network because users cannot log on unless they insert one of the cards.

Netmate/SX workstations are available now, with prices starting at $2,000 for a minimally configured diskless model. Versions with floppy and hard disk drives are also available.

# U.S. Companies Involved In ISDN Trials And Service Rollouts

| Company | Switch | Access | Carrier | Status | Note |
|---|---|---|---|---|---|
| **Aetna**, Hartford, Conn. | AT&T 5ESS | Basic | Southern New England Telephone | Installation underway | |
| **Alverno College**, Milwaukee | Siemens EWSD | Basic | Wisconsin Bell | Started March 1988, ends 1989 | Trial. |
| **American Express**, Phoenix, Ariz. | AT&T System 85 PBX/4ESS | Primary | AT&T | Started July 1988 | First customer of AT&T's Primary Rate. |
| **American Transtech**, Jacksonville, Fla. | AT&T System 85 PBX/4ESS | Primary | AT&T | Started Dec. 1987 | Beta test site for AT&T's Primary Rate. |
| **Arizona, State of**, Phoenix | Northern Telecom DMS-100 | Basic | US West Communications | Started Nov. 1986, officially ended | |
| **Boeing Co.**, Seattle | AT&T 5ESS | Basic | US West Communications | Scheduled start Nov. 1988 | |
| **Carnegie Mellon University**, Pittsburgh | AT&T 5ESS | Basic | | Contract pending | |
| **Chevron Corp.**, San Francisco | Northern Telecom SL-100/ DMS-100 | Primary/Basic | Pacific Bell | Installation underway | |
| **Contel Corp.**, Atlanta | AT&T 5ESS | Basic | Southern Bell | Started April 1988 | Paying customer. |
| **Control Data Corp.**, Minneapolis | NEC NEAX 61E | Basic | US West Communications | Started Nov. 1987, ends Nov. 1988 | Trial. |
| **Duke University**, Durham, N.C. | AT&T 5ESS | Basic | Southern Bell | | |
| **Eastman Kodak Co.**, Rochester, N.Y. | Northern Telecom SL-100 PBXs | Primary | | Started Aug. 1988 | First Primary Rate using two SL-100s. |
| **Federal National Mortgage Assoc.**, Washington | AT&T 5ESS | Basic | C&P Telephone | Started June 1988 | |
| **First Data Resources Inc.** (American Express subsidiary), Omaha, Neb. | Northern Telecom SL-1 PBX and AT&T 4ESS | Primary | AT&T | Unannounced | |
| **Glaxo Inc.**, Research Triangle Park, N.C. | SL-1 PBX and DMS-100 | Primary/Basic | GTE South | Started June 1988 | First Primary Rate/Basic Rate in one trial. |
| **Hardees**, Rocky Mount, N.C. | Northern Telecom DMS-100 | Basic | Carolina Telephone | Scheduled start Jan. 1989 | |
| **Hayes Microcomputer Products Inc.**, Norcross, Ga. | AT&T 5ESS<br>AT&T 5ESS | Basic<br>Basic | Southern Bell<br>Pacific Bell | Started April 1988<br>Sept. 1987 to Sept. 1988 | Using ISDN to develop ISDN products. |
| **Hershey Foods Corp.**, Hershey, Pa. | AT&T 5ESS | Basic | Contel of Pennsylvania | Scheduled start Oct. 1988 | Will include ISDN satellite transmission. |
| **Honeywell Information Systems** (Honeywell Bull), Minneapolis | Northern Telecom DMS-100 | Basic | US West Communications | Started Jan. 87, officially ended | Applications included data/voice transmission between office and employees at home. |
| **Intel Corp.**, Chandler, Ariz. | AT&T 5ESS | Basic | US West Communications | Started Feb. 1987, ended Aug. 1987 | Trial. |
| **Johns Hopkins Medical Center**, Baltimore | AT&T 5ESS | Basic | C&P of Maryland | Contract pending | |
| **Lawrence Livermore Laboratory** (University of California), Livermore, Calif. | AT&T 5ESS | Basic | AT&T Federal Systems | | |
| **Lockheed Missiles and Space Co. Inc.**, Sunnyvale, Calif. | AT&T 5ESS | Basic | Pacific Bell | Started Sept. 1987, ended Sept. 1988 | Trial. |
| **Mass. Institute of Tech.**, Cambridge | AT&T 5ESS | Basic | | Scheduled cutover Oct. 1988 | Using AT&T 5ESS as PBX for private network. |
| **Mather Air Force Base**, Sacramento, Ca. | AT&T 5ESS | Basic | AT&T Federal Systems | Started Aug. 1988 | Model for ISDN deployment at 50 bases. |
| **McDonald's Corp.**, Oakbrook, Ill. | AT&T 5ESS | Basic | Illinois Bell | Started Dec. 1986 | |
| **McDonnell Douglas Corp.**, St. Louis | | Primary | AT&T | Unannounced | |
| **Microcom Inc.**, Norwood, Mass. | | Basic | New England Telephone | Installation underway | Part of centrex contract. |
| **Motorola Inc.**, Schaumburg, Ill. | Northern Telecom DMS-100 | Basic | Illinois Bell | Planning stage | |
| **NASA**, Washington | AT&T 5ESS | Basic | AT&T Federal Systems | | |
| **Nice Corp.**, Ogden, Utah. | Northern Telecom SL-1s | Primary | | | Telemarketing company using private ISDN. |
| **North Carolina State Univ.**, Raleigh | Northern Telecom DMS-100 | Basic | Southern Bell | | |
| **Northeast Utilities**, Hartford, Ct. | Northern Telecom SL-1s | Primary | | | PBXs in Rocky Hill Ct. and Meriden, Ct. |
| **Pennsylvania, State of**, Harrisburg | Northern Telecom DMS-100 | Basic | Bell of Pennsylvania | Contract pending | Statewide network with ISDN in Harrisburg. |
| **Pratt & Whitney**, East Hartford, Conn. | AT&T 5ESS | Basic | SNET | | |
| **Prime Computer Inc.**, Natick, Mass. | AT&T 5ESS | Basic | Southern Bell | Started April 1988 | Paying customer. |
| **Rockwell Communication Systems**, Richardson, Texas. | AT&T 5ESS with two remotes. | Basic | Southwestern Bell | Scheduled start Dec. 1988 | 40 buildings in a campus environment will be linked via ISDN. |
| **Shearson Lehman Hutton Inc.**, New York | AT&T 5ESS | Basic | New York Telephone | Started June 1988 | Part of 8,000 line centrex contract. |
| **Shell Oil Co.**, Houston | AT&T 5ESS | Basic | Southwestern Bell | Start Sept. 1988 | Plan to use 5,000 ISDN lines. |
| **Southern Methodist University**, Dallas | Siemens EWSD | Basic | Southwestern Bell | Started Feb. 1988 | |
| **SunTrust Service Corp.**, Atlanta | AT&T 5ESS | Basic | Southern Bell | Started April 1988 | Paying customer. |
| **3M Corp.**, St. Paul, Minn. | AT&T 5ESS | Basic | Southwestern Bell | Started Aug. 1988 | Plan to use 3,165 ISDN lines. |
| **Tenneco Inc.**, Houston | AT&T 5ESS | Basic | Southwestern Bell | Started June 1988 | Plan to use 3,900 ISDN lines. |
| **Texas A&M University**, College Station | GTE GTD-5 EAX | Basic | GTE Southwest | | |
| **University of Arizona**, Tucson | AT&T 5ESS | Basic | US West Information Systems Inc. | Planning stage | Using AT&T 5ESS as PBX in private network. |
| **University of Connecticut**, Storrs | AT&T 5ESS | Basic | SNET | | |
| **University of Indiana**, Bloomington | Northern Telecom DMS-100 | Basic | Indiana Bell | | |
| **University of Maryland**, College Park | | | | Unannounced | |
| **University of South Florida**, Tampa | AT&T 5ESS | | GTE South | Started Oct. 1987 | |
| **U.S. Dept. of Treasury**, Wash. | | | | Contract pending | |
| **U.S. Bank of Oregon**, Portland | Northern Telecom DMS-100 | Basic | US West Communications | Started March 1987 | Trial. |
| **Virginia, State of**, Richmond | AT&T 5ESS | Basic | C&P of Virginia | Started April 1988 | |
| **West Virginia University**, Morgantown | AT&T 5ESS | Basic | C&P of West Virginia | Scheduled start Dec. 1988 | Plan to use 660 ISDN lines. |

Note: This chart was compiled by *CommunicationsWeek* with information provided by Teleos Communications Inc., Eatontown, N.J., as well as from news releases and published reports. Carriers, switch manufacturers and their affiliated laboratories are not listed.

# The ISDN Scorecard.

As the demand for ISDN grows, so does the number of ISDN suppliers eager to take credit.

But, as you can see by this CommunicationsWeek chart, there is one clear-cut ISDN leader—the company that helped build the standards for ISDN. That company is AT&T.

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# Token ring ties MIT Ethernet local nets

continued from page 27

in five years," Rochlis said.

Rochlis and Hoffmann said there is nothing unorthodox about using a token-ring backbone network to connect Ethernets.

The internetwork routers contain a token-ring adapter and an Ethernet adapter. The routers strip the header from an Ethernet data packet and replace it with a token-ring header. It is then sent across the token-ring network to the next internet router, where the process is reversed.

"The fact that it's a token ring is irrelevant," Rochlis said. "It presents no problems to interconnect Ethernets with a token-ring backbone and exchange data."

He said TCP/IP aids in the transmission of information across the token-ring bridge.

"It may be a well-kept secret, but TCP/IP makes the physical, [data] link and network layers transparent to the application. So no high-level protocol conversion is required," Rochlis said.

The internetwork routers also serve as buffers, isolating problems on a particular local net and keeping them from disrupting the entire wide-area network, Hoffmann said.

Ethernet bridges do not provide that level of fault isolation in a campus environment such as MIT's, he said.

"Our network setup is quite commonplace," Hoffmann added. For instance, Boston University also has a token-ring backbone to connect Ethernet local nets. "The only difference between theirs and ours is the fact that they have a ProNet-80, 80M bit/sec token ring," he said.

For the foreseeable future, the ProNet-10 token ring is sufficient to meet MIT's networking needs, and there are no immediate plans to migrate to the Fiber Distributed Data Interface, Rochlis said.

"We're not dying for lack of bandwidth," he said. "Eventually though, we'll probably migrate to FDDI, but we have the luxury of waiting for FDDI to become more mature and affordable." ◼

# Netnotes

continued from page 27

The 6140 adapter is available now. It costs $595 per unit and $495 in quantities of 100 or more.

**Shiva Corp.** of Cambridge, Mass., last week introduced software that enables IBM Personal Computers and compatibles to share peripherals over an Apple Computer, Inc. 230K bit/sec LocalTalk network.

The new DOS Connect software resides on a Personal Computer and enables Personal Computers on a LocalTalk net to access and share printers, plotters and scanners, according to Shiva President Dan Schwinn. DOS Connect works in conjunction with Shiva's earlier NetModem and NetSerial hardware products, Schwinn said.

NetModem is a Hayes Microcomputer Products, Inc.-compatible, 2,400 bit/sec modem that attaches directly to LocalTalk nets; NetSerial is a hardware interface that connects peripherals to Apple networks.

Until now, Schwinn said, the NetModem and NetSerial devices could only be accessed from Macintoshes on an Apple network.

"This meant that if the network contained both PCs and Macs, only the Macs could share modems and peripheral devices. Now, DOS Connect lets PC users on a network access and share peripherals on LocalTalk nets as though they were Macintosh systems," Schwinn said.

DOS Connect is available now and costs $100.

# Social Security links nationwide E-mail net

continued from page 27

a-box" is an AT-class system hosting six to 18 coprocessor boards from Cubix Corp.

Each Cubix card is a personal computer on a board, with its own microprocessor, memory and communications port. The boards are networked to one another via the host system's bus rather than cable.

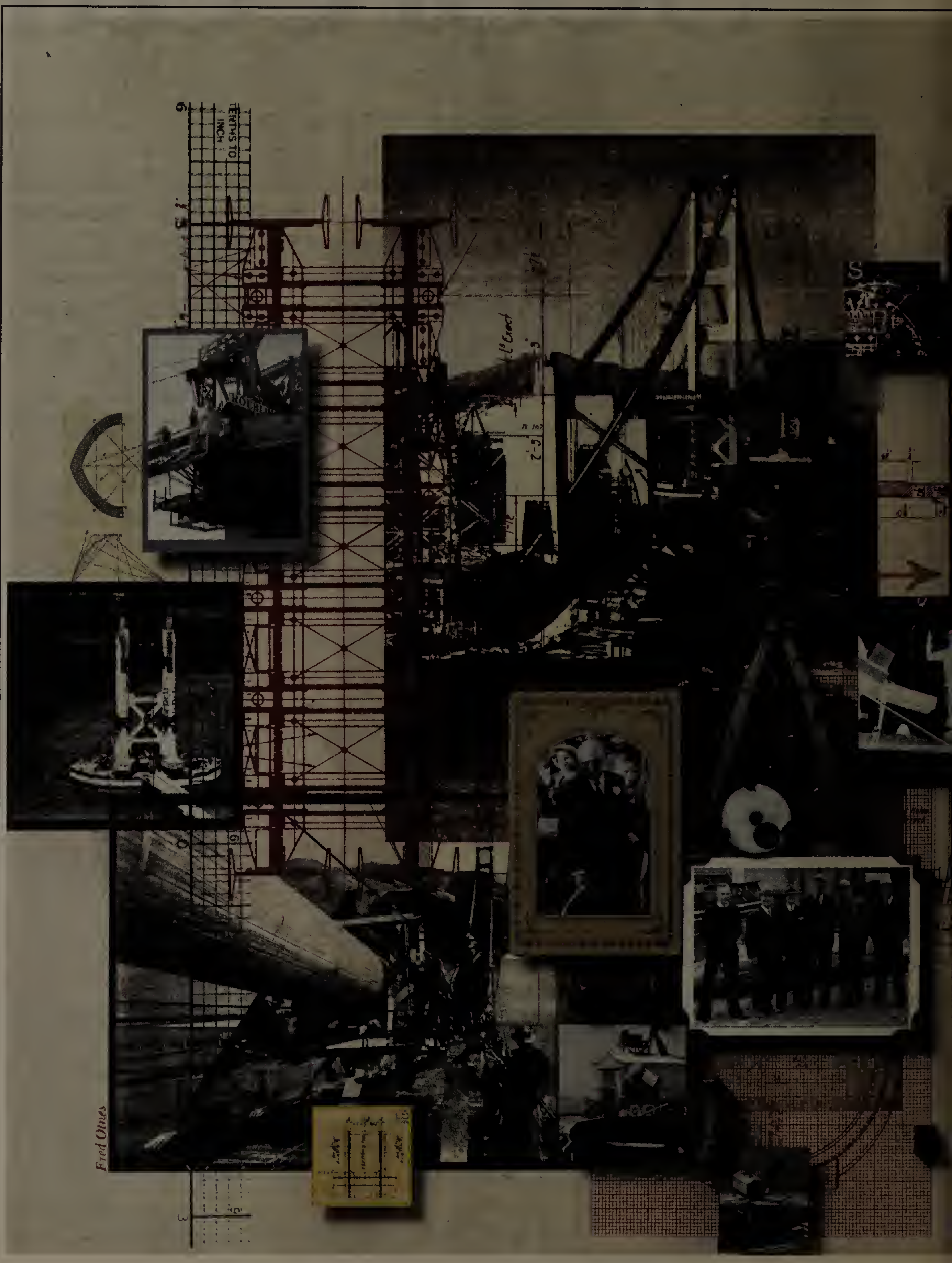
An incoming message goes to the first available Cubix board, which processes it for forwarding by reading the cc:Mail address header.

Because most SSA sites have only standalone personal computers, the E-mail system initially will be used largely for communications of a site-to-site nature, said Don Black, LAN program manager for the General Services Administration's Federal Office Automation Center, which helped put together the contract for the system.

The type of person-to-person messaging usually associated with E-mail will be restricted to the 80 sites that have already installed local networks. The SSA is still heavily mainframe-oriented, with tens of thousands of 3270 terminals and only 6,000 personal computers for its 60,000 employees, Black said. However, the SSA is expected to more than double its number of personal computers by the end of the year. This influx of personal computers, combined with the selection of a personal computer-based E-mail system, should help spur the installation of local networks at some of the SSA sites, Black said.

Schneider said the simplicity of the LAN-in-a-box solution that ATS put together had a lot to do with the SSA's choice of the cc:Mail system. Compared to a mainframe-based E-mail system, the ATS package was inexpensive and easy to install, use and maintain.

Also, the SSA's request for bids was issued as a GSA Quick Response Proposal, which streamlines the procurement process considerably. The request for bids was put out last December, and ATS expects to have the initial installation phase completed within the next 18 weeks. ◼


Fred Otnes

**Novell, Inc.** and **Xerox Corp.** recently said they will jointly develop networked versions of Xerox's Ventura Publisher desktop publishing software.

Xerox also unveiled Xerox Ventura Publisher: 2.0 3-Pak Workstation, a three-user networked server version of its Ventura Publisher software. The package costs $995, which is a savings of $1,690 over the cost of three single-user versions plus network server software.

As part of the alliance, the two companies will develop product enhancements for Xerox's existing work group publishing software. Xerox already offers Xerox Ventura Publisher: Network Server, an MS-DOS-based program that offers desktop publishing network services to personal computers over networks running Novell's NetWare. ◪

# 3Com enhances NCS line with new security, access-control features

By Susan Breidenbach
West Coast Bureau Chief

SANTA CLARA, Calif. — 3Com Corp. recently added new security and access-control capabilities to its line of Network Control Server (NCS) systems, which are used to manage TCP/IP-based wide-area networks.

The software enhancements give network administrators greater centralized control over 3Com terminal servers, bridges and gateways used to link Transmission Control Protocol/Internet Protocol-based local networks to wide-area nets, the company said.

NCS was first released by 3Com last summer. It comes in two versions: The NCS/AT includes an IBM-standard 80286-based Personal Computer, and the NCS/2 is based on a Sun Microsystems, Inc. 68020-based workstation running Unix.

The devices generate audit trails, monitor network activity in real time, create activity logs and produce graphical data analysis of network trends and problems.

The key enhancement to NCS is an Access Control System (ACS) that lets network administrators restrict access to network resources according to a variety of factors, such as time of day and location of user. For example, some users may be allowed to access a particular host only during nonpeak hours or may have only local-access privileges.

The University of North Carolina Medical School's information systems department, a beta test site for the software, is using the ACS feature to restrict access to the school's Digital Equipment Corp. VAX minicomputers.

The medical school, located in Chapel Hill, has a 70-node TCP/IP network that includes 45 Sun multiuser workstations and a number of VAXes running Unix or VMS. There are also 45 3Com terminal servers that provide a total of 400 personal computers and Macintoshes with access, in terminal-emulation mode, to various host systems via Telnet.

Gerard Robinson, manager of technology development for the school's information systems department, said the ACS software "provided a level of security that was acceptable to the medical school."

Robinson may also use ACS to make sure the dial-out lines on the medical school's network are used only by authorized personnel. Today, the school has minimal safeguards in place to protect its network from misuse.

Another piece of the NCS enhancement software is 3Com's implementation of TCP/IP's Domain Name Service (DNS). DNS is a naming service in TCP/IP-based networks that allows network administrators to maintain an identification data base of network devices and programs. The enhancement was developed because administrators found that a single, centralized name service data base is too difficult to manage.

The Access Control System lets net administrators restrict access to resources according to a variety of factors.

▲▲▲

The DNS feature lets NCS users divide their TCP/IP internetworks into groups of nodes, or domains, with each domain's name service managed by a separate NCS box. If an NCS receives a request for a resource that is not within its domain, it refers the request to another NCS.

The DNS data base converts the resource names employed by users into specific addresses on the wide-area network.

3Com has further enhanced the NCS product with an improved remote-boot protocol that lets administrators remotely boot terminal servers over links as slow as 56K bit/sec. Previously, network administrators could only boot servers over T-1 lines.

Also, a new broadcast-boot capability enables users to start up multiple terminal servers concurrently, eliminating the need to reactivate them one at a time in the event of a power outage or other catastrophic failure.

The software upgrade for existing NCS/ATs is priced at $5,000, and the upgrade for the NCS/2 costs $12,000. Complete systems, including the new software, are priced at $12,000 and $45,000, respectively. The products are available now. ◪

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# MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USERS GROUPS AND ASSOCIATIONS

## Worth Noting

"A network manager must have the wisdom of King Solomon to remain objective in the face of vendor claims and upper management wishes."

**Patrick Springer**
Director of strategic
services consulting
Telecommunications
Management Corp.
Needham, Mass.

## Dialogue

**What impact will the 24-hour trading networks being built by stock and futures exchanges have on financial markets?**

"Globex [the 24-hour trading system being built by the Chicago Mercantile Exchange] is leading the way into the future of trading.

"I think it's an absolute foregone conclusion that all the firms are going to have to get on board [and support] that type of system.

"These networks are going to provide more revenue opportunities. They're also going to present a lot of challenges. Generally, trading systems and exchanges do trades during the sunlight [hours], then shut down and do processing during the dark.

"If you're trading 24 hours, you don't have that opportunity. People are going to have to go in and redo a lot of systems."

**Gerard Higgins**
Senior vice-president
of data processing
and communications
Drexel Burnham Lambert, Inc.
New York

"I'm not sure the customer wants or needs that right now. I don't think anyone has asked individual investors if that's something they want.

"Before we can launch into 24-hour trading, we need to find out what the customer needs and wants."

**Rich Malone**
Manager of data processing
Edward D. Jones & Co.
Maryland Heights, Mo.

# Management skills vary with size of network unit

Different firms require range of leadership styles.

By Wayne Eckerson
Staff Writer

While network managers in different companies may share the same titles, the skills they need to perform effectively vary greatly depending on the size of the network departments they supervise.

Managers of small shops tend to be technical specialists who work closely with employees, while managers of larger shops spend less time directly supervising staff and more time dealing with upper management and reviewing strategic network needs, according to network managers and consultants interviewed by *Network World*.

The network manager of a small staff of five to 15 people, for example, needs to maintain technical expertise in many areas and be able to lend a hand to address pressing network problems that may arise on a daily basis.

The manager tends to function as the leader of a small team "where everyone works together as part of one big, happy family," said Ronald Brown, an independent telecommunications consultant in Melrose, Mass. "The [manager needs to] have a personal and accessible management style and lead as much by example as by direction."

The head of a larger network department, on the other hand, must be more of a management specialist who recruits, motivates and trains workers to handle technical problems and day-to-day operations but doesn't get involved directly in these tasks, network managers said.

The manager's primary responsibility is to employ network technology to achieve corporate objectives. This requires cultivating close contacts with upper management and carefully following trends in the industry, managers said.

"The manager of a small shop must be a technical generalist, whereas the manager of a large operation has to be a management specialist who keeps a close watch on corporate strategy," said Patrick Springer, director of strategic services consulting at

*(continued on page 34)*

**GUIDELINES**

BY ERIC SCHMALL

## Enriching work is best long-term motivator

This year marks the 30th anniversary of the publication of Frederick Herzberg's landmark book *Motivation to Work* (New York: John Wiley & Sons, 1959).

The ideas Herzberg outlined in that work, as well as subsequent studies affirming his theories, provide a wealth of information on this often misunderstood topic. For communications managers who struggle to motivate their workers to attain excellence, his concepts offer valuable insight.

Herzberg rejects the traditional carrot-and-stick philosophy to which so many managers subscribe. The lures of better pay, improved benefits, pleasant working conditions or increased status provide only short-term incentives to work harder. Threats of punishment involving the reduction of any of these perks also have very limited impact.

No matter how much management promotes such incentives, employees eventually become dissatisfied and need additional expensive incentives dangled in front of them to maintain or improve their performance. This endless spiral pushes up costs, bringing with it only marginal productivity gains.

Herzberg's research has demonstrated that this cycle can be broken.

While he does not deny the importance of job factors such as improved pay and benefits in keeping workers satisfied, he claims that long-lasting motivation can only be attained by providing enriching and meaningful jobs.

The factors that give people the deepest satisfaction include

*(continued on page 34)*

*Schmall is network systems manager for an insurance holding company.*

**MANAGEMENT PROFILE**

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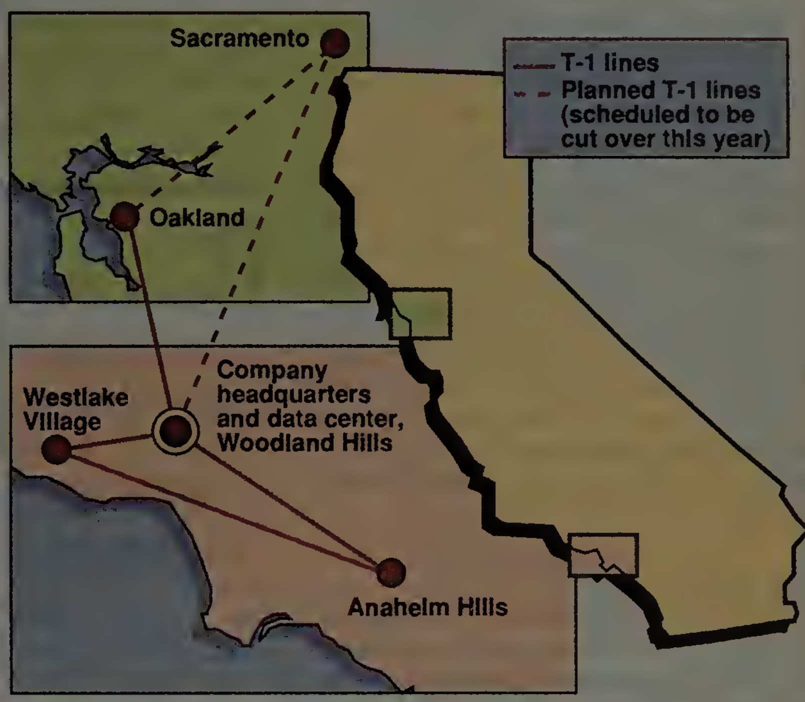
BY BARTON CROCKETT

Blue Cross of California's backbone net


Sacramento
Oakland
Westlake Village
Company headquarters and data center, Woodland Hills
Anaheim Hills
T-1 lines
Planned T-1 lines (scheduled to be cut over this year)

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: BLUE CROSS OF CALIFORNIA, WOODLAND HILLS

# Net strategy puts insurer on the road to recovery

WOODLAND HILLS, Calif. — Financially beleaguered Blue Cross of California is hoping a new-generation insurance processing system and an expanded network will help nurse the company back to health.

Blue Cross of California, based here, insures some six million Californians.

Over the last three years, the company has suffered more than $120 million in losses, some of which can be chalked up to the company's inefficient, 10-year-old information systems, according to David Guild, Blue Cross' vice-president of information systems.

Blue Cross' David Guild

"We've found that in certain situations, our overhead costs are 50% higher than the competition's," Guild said. "Part of this [stems] from our information support. Our software was so awkward and so difficult to use that we had to have more people [than the competition] to run our [systems and network]."

To remedy this situation, Blue Cross of California is replacing its existing insurance processing software with software it is designing, called System for Managed Care (SMC), which will handle a variety of insurance-related functions.

SMC, like the existing software, will run on the company's Amdahl Corp. mainframe in its data center here.

According to Guild, SMC will not only increase the efficiency of operations, but it will also allow Blue Cross of California to provide better service to customers, including those that use the company's network.

Blue Cross of California currently operates a four-node T-1 backbone network (see graphic, this page).

According to Steve Barnes, the company's vice-president of information processing services, 475 hospitals are linked to the nodes on a total of about 50 4.8K bit/sec and 9.6K bit/sec multidrop lines. The multidrop lines support dumb terminals that hospitals use to enter insurance claims for their patients.

According to Guild, SMC will enable Blue Cross of California to deliver more information over this network. In addition to filing claims, hospitals will be able to use SMC to access a wide range of insurance data, including the status of pending claims.

*(continued on page 34)*

# Strategy puts insurer on road to recovery

continued from page 33

Blue Cross of California also wants to make electronic access available to its 10,000 largest group customers, Guild said.

Over the next three years, the insurance company plans to install dumb terminals in its group customers' offices. These terminals will be connected to the backbone network via dial-up or dedicated lines. Group customers will be able to use the terminals to inquire about the status of claims filed by their employees, Guild said.

Using SMC, group customers can also determine the impact of hypothetical changes in their group insurance coverage. A group customer will be able to ask, for instance, how much it would cost to add day-care coverage to its employee health benefits. SMC will then calculate an estimate and send it back over the network.

"Other insurance companies say they put terminals in their customers' offices," Guild said. "But none have this capability."

## Sign of the times

According to Guild, the information systems and networking efforts are helping Blue Cross of California respond to the changes that have rocked the health insurance industry during the past decade.

In that time, health expenses have skyrocketed, rising from 6% to 11% of the gross national product, Guild said. Health insurers such as Blue Cross of California have been hit hard by these rising expenses.

In response, they have been looking for innovative ways to cut health costs. Alternative methods of providing health coverage have arisen, such as Health Maintenance Organizations (HMO) and Preferred Provider Organizations (PPO), that are designed to reduce expenses.

Blue Cross of California has been at the vanguard of these changes. The company now owns the state's second largest HMO, CaliforniaCare. According to Guild, Blue Cross of California now gets more than 60% of its business from PPOs.

"This used to be a simple indemnity business," Guild said. "Now the game's completely changed."

Guild said Blue Cross of California's decade-old information systems are ill-equipped to handle these new plans. "They do fine with the kind of business we did 10 years ago, but now they simply don't cut it."

He said existing systems must be jury-rigged to accommodate the new insurance plans. This leads to inefficiencies that slow claims processing and result in a profusion of errors.

SMC is designed to handle these new plans, Guild said. In addition, it will encourage customers to handle more transactions electronically with Blue Cross of California.

> Blue Cross of California has been at the vanguard of changes in the health insurance industry. The company now owns the state's second largest HMO, CaliforniaCare.
>
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"SMC will speed the response of the network, which will make our customers more responsive to sending us claims electronically," he said. "This, in turn, will reduce clerical costs and errors."

To support additional traffic, Barnes said the company is expanding the capacity of its network. A new backbone node will be added in Sacramento, Calif., later this year, with T-1 lines running from that node to Oakland, Calif., and here.

In addition, the company is migrating all of its 4.8K bit/sec hospital multidrop lines to 9.6K bit/sec lines.

"We need to upgrade our lines to accommodate SMC," Barnes said.

# Enriching work is best motivator

continued from page 33

achievement, recognition, personal growth, career development and the challenges inherent in the job itself.

Pay and benefits satisfy an individual's basic needs; Herzberg's motivators strike a deeper human chord, giving an individual a sense of worth and meaning in his daily work.

Communications managers will find comfort in Herzberg's findings. All too often, those managers have focused on the wrong factors, thinking that incentives such as pay raises or bonuses would motivate staff members.

Managers also have felt frustrated because they lack the authority to bestow many positive motivators upon their workers.

Many network managers have little influence on company policies and benefits. They can promote and award bonuses only within a narrow, rigid set of organizational guidelines.

Despite their lack of control in these areas, some communications managers unknowingly have great power to invoke a vast array of real motivators.

First, managers have the opportunity to enrich many of the jobs under their control. This is done by bestowing responsibility and autonomy in key areas of an individual's job.

For instance, a manager may give an analyst more complete control over a region of a network, including responsibility for finding unique ways of integrating voice and data services in order to reduce costs. Such enrichment also allows for greater creativity and innovation in design and equipment selection.

Another powerful motivator that can be particularly useful in this field is education. Given the vast array of new network technologies, staff members have to be given opportunities to learn the details of the nascent products and how they might be utilized in the network. By providing these opportunities — even if it's only subscribing to technical magazines or purchasing self-study guides — the manager is setting into motion a significant motivating force. People who have the chance to learn are more likely to feel fulfilled.

Motivation will also arise from a manager who helps his staff set career goals and offers advice on ways to achieve those goals. He needs to keep job definitions updated and to establish a clearly marked path that shows what skills and experience they need to advance.

Finally, the manager must realize the importance of recognizing achievements. As people develop skills and reach more challenging goals, a manager can motivate best by acknowledging those attainments. The manager should bestow such recognition — both publicly and privately — as part of his primary duties. Nurturing the human spirit is a fundamental motivator.

Any manager who relies upon short-term incentives such as pay raises and bonuses will find that they are costly and ultimately unsuccessful means of achieving sustained superior effort. People want to grow in ways beyond the mere creature comforts that such rewards allow. By attending to these higher order needs through motivating factors, a manager makes his greatest contribution to his staff and the organization.

# Management skills vary with size of unit

continued from page 33

Telecommunications Management Corp., a management consulting firm in Needham, Mass.

In many ways, the positions couldn't be further apart. "The greatest manager in the world in a small shop might fail as a manager in a large shop, and vice versa," Brown said.

## In the spotlight

The manager of a small department usually has direct responsibility for a wide range of tasks that in a larger department would be handled by teams or lower level managers, network managers said.

For example, the manager of a small department needs to develop the departmental budget, write requests for proposal, call vendors when there are problems and set schedules for maintenance.

In addition, the manager must serve as the main point of contact for upper management, end users and vendors.

"Managers of small shops control their own destinies, but there is a price," said Springer, who was a communications manager for several companies before becoming a consultant. "They are the ones in the spotlight if anything in network operations goes wrong."

Springer said network users in small organizations are less forgiving than those in larger ones when a problem arises. "People in small organizations don't have patience; they don't appreciate the difficulty of trying to resolve a complex problem. They want you to fix the problem while they are standing talking to you," he said.

Net managers at large companies have to establish close ties with senior executives in order to keep abreast of corporate objectives, according to Robert Brown, superintendent of telecommunications systems at Detroit Edison Co. in Detroit.

These managers are judged on how well they work with upper management in explaining new technologies and outlining ways that network technology can be used for competitive advantage, Brown said.

"These managers have more clout within their organization but also more responsibility. They must translate corporate objectives into a cost-effective networking strategy that enhances the company's competitive position," he said.

> "Managers of small shops are the ones in the spotlight if anything in network operations goes wrong."
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Large net operations also have bigger communications staffs and a wider array of technologies and vendor equipment.

"The increasingly heavy investment in network operations by most major companies means upper management tends to scrutinize networking expenditures and long-range plans very closely," said a manager at Sears Technology Services, Inc. in Arlington Heights, Ill., who requested anonymity.

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# PRODUCTS & SERVICES

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## Worth Noting

See inside for:

- Asante Technologies boards link Mac SE, SE/30 to Ethernets.
- The Wollongong Group software links PC nets to backbone Ethernets running TCP/IP.
- Pacer software lets Macs access files on VAXes running Ultrix.

## First Look

### Micro-to-fax boards double as modems

**Quadram, an Intelligent Systems Co.,** and **Circuit Research Corp.** recently introduced new microcomputer-to-facsimile boards that double as 2,400 bit/sec modems.

**The Quadram JT Fax Pro 96,** an addition to the company's line of JT Fax products, is for IBM Personal Computers. The board enables Personal Computer users to transmit to a CCITT Group III facsimile machine or receive facsimile documents at speeds up to 9.6K bit/sec. The board also supports communications with Hayes Microcomputer Products, Inc.-compatible modems at 2,400 bit/sec. It comes with software that controls both facsimile and data communications functions.

In addition to standard JT Fax product features, the JT Fax Pro 96 software provides data communications features such as file transfer and terminal emulation.

The JT Fax Pro 96 includes all the hardware and software necessary for communicating with the installed base of Hayes-compatible modems and facsimile machines.

Circuit Research Corp.'s **FlexFAX** facsimile modem is designed for use in Apple Computer, Inc.'s Macintosh computers.

The board supports communications with Macintoshes that are outfitted with Apple's Applefax facsimile mo-

*(continued on page 36)*

## Multiplexer supports 14 T-1 circuits

By Jim Brown
New Products Editor

RICHARDSON, Texas — Integrated Telecom Corp. last week introduced an entry-level T-1 multiplexer capable of supporting as many as 14 T-1 circuits.

The Accustream 1000 is compatible with AT&T T-1 standards, enabling users to access such central office-based services as fractional T-1, switched 56K bit/sec digital data service (DDS) and switched voice services.

With Accustream 1000, a user with T-1 access to a central office can configure a T-1 circuit's 24 64K bit/sec channels into several groups, each of which can be routed to remote Accustream 1000s over fractional T-1 links.

Accustream 1000 is a smaller version of the company's Accudacs Series I, which supports as many as 32 T-1 circuits. Like the Accudacs, Accustream 1000 acts like a digital cross-connect system capable of switching DS0 channels from one T-1 circuit to another.

The Accustream 1000 cabinet has nine board slots, two of which are used to support a power supply and a CPU. The remaining seven slots support a mix of voice and data interface boards, including T-1 boards that support two T-1 interfaces each.

A voice server board supports as many as four Integrated Telecom Channel Bank Chassis. Each chassis can be configured to support up to 12 boards that digitize voice at 64K bit/sec using pulse code modulation or 12 office channel unit data port boards operating at up to 56K bit/sec each.

An adaptive differential pulse code modulation (ADPCM) board is used to compress 64K bit/sec digitized voice channels to 32K bit/sec. Users attach a T-1 circuit from a channel bank or private branch exchange T-1 port to an ADPCM board. The 24 64K bit/sec voice channels are compressed into 24 32K bit/sec channels, which are inserted into 12 DS0 time slots on a T-1 circuit.

> The Accustream 1000 enables users to access fractional T-1 and switched voice services.
>
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The Accustream 1000 also supports data boards, each of which has four RS-232, RS-449 or V.35 ports. Each port supports data speeds up to 1.536M bit/sec. The data boards also support subrate data multiplexing, which en-

*(continued on page 37)*

## *Converter allows 8 ASCII devices to share coax link*

WOODBRIDGE, Va. — Renex Corp. recently announced a protocol converter that enables as many as eight ASCII devices to share a single coaxial cable link to an IBM 3174 or 3274 cluster controller.

The company's stand-alone Protocol Converting Multiplexer (PCM) emulates an IBM 3299 multiplexer and can support personal computers, ASCII terminals and ASCII printers.

Software running on the converter makes attached terminals appear to IBM mainframes as IBM 3270-type terminals and makes ASCII printers resemble system printers such as the IBM 3287. Personal computers attached to the PCM run Renex's R-Link communications software and appear as 3270s.

Personal computers, ASCII terminals and ASCII printers can be directly attached to a PCM port via an RS-232 link at speeds up to 19.2K bit/sec. Alternatively, each PCM port can be configured with an internal 2,400 bit/sec asynchronous modem supporting communications with remote ASCII devices.

### Coaxial connection

The PCM converts an asynchronous data format to an IBM Synchronous Data Link Control format and is linked to the controller via an IBM Type A coaxial cable connection.

Each PCM port supports five simultaneous host sessions, meaning the PCM can support a total of 40 sessions. The PCM also supports file transfers between the host and attached devices using IBM's host-resident IND$FILE file transfer software.

Scheduled to ship in June, the PCM is positioned to compete against personal computer-based emulation board products and is priced at $5,495.

Renex can be reached by writing to 1513 Davis Ford Road, Woodbridge, Va. 22192, or call (703) 494-2200.

## DOME enables Macs to access VAX data

### Software defines series of commands, functions as single object, streamlining data management.

By Jim Brown
New Products Editor

CARMEL, Ind. — Dome Software Corp. released software last week that will enable developers to build applications that let Apple Computer, Inc. Macintosh users access data base management applications and data on a Digital Equipment Corp. VAX.

Aimed at software developers in Fortune 500 companies, Dome Software's Distributed Object Management Environment (DOME) package consists of server software that runs on a VAX and client software that runs on a Macintosh Plus, SE or II with at least 1M byte of random-access memory.

Macintoshes outfitted with Ethernet adapters communicate with VAXes supporting Apple's networking protocols.

The DOME object-oriented software enables developers to define a series of software commands or other data management functions as a single object. The object will execute commands or perform the defined data management functions when an end user issues a single command from the microcomputer.

The DOME software enables a Macintosh user to issue a command on the Macintosh, which then causes an object stored on the server to perform a series of application processing tasks.

Once defined, objects can be reused in multiple applications, reducing application development time, said Dome Software President Robert Hogan.

The Macintosh-based client applications will have DOME graphical icons. When selected, the icon issues a command that enables the Macintosh to access a server-resident object that may contain a string of data or a data base management program capable of retrieving data, processing that data and returning an answer to the end user.

By comparison, other client/server data base management products require microcomputer users to issue a sequence of commands to retrieve data from a server and then perform all data processing chores locally.

The DOME software is aimed initially at the scientific community, which often needs to retrieve test results or invoke applications to compare results of varying tests and display an answer for the end user.

The heart of the DOME package is the VAX-based DOME Resource software module. DOME Resource consists of an Oracle Corp. relational data base management system and an application development aid called DOME Toolkit.

The DOME software also consists of DOME Navigator and HyperDOME software for the Macintosh. DOME Navigator enables the Macintosh user to view the contents of objects stored on the VAX. DOME Navigator also allows users to edit VAX-based data files, build relational data base queries, enter data and import VAX-resident data into other Macintosh applications.

HyperDOME enables users to develop Macintosh applications that make use of Apple's HyperCard product. With HyperCard, developers can build custom screen formats for existing Macintosh applications. HyperDOME allows developers to create customized screens for DOME Navigator applications.

> Once defined, objects can be reused in multiple applications, reducing development time.
>
> ▲▲▲

Commands issued by DOME Navigator or HyperDOME applications are transmitted to DOME Resource via a Dome Software proprietary Message Passing Protocol. DOME Resource converts the commands contained within that Message Passing Protocol into the commands needed to access the appropriate object on the server.

A low-end version of the DOME software that includes DOME Resource, the Oracle DBMS, DOME Toolkit running on a DEC MicroVAX, and a license for DOME Navigator and HyperDOME for one Macintosh costs $25,000. Each additional DOME Navigator and HyperDOME license costs $999, and quantity discounts are available.

Dome Software can be reached by writing to 655 W. Carmel Drive, Suite 151, Carmel, Ind. 46032, or call (315) 573-8100.

## First Look

continued from page 35

dem and software. It features custom facsimile phone directories that enable users to store frequently dialed numbers.

The board allows Macintosh users to transmit multiple documents to multiple Macintoshes outfitted with Applefax boards as well as to multiple CCITT Group III facsimile machines at 9.6K bit/sec. The board can also be used to transmit data to CCITT- and Bell-compatible modems operating at 2,400 bit/sec.

JT Fax Pro 96 is priced at $495, and shipping is scheduled to begin by May 30. The FlexFAX is priced at $1,095 and is available now.

*Quadram, an Intelligent Systems Co., 1 Quad Way, Norcross, Ga. 30093, or call (404) 923-6666.*

*Circuit Research Corp., 4 Townsend West, Suite 3, Nashua, N.H. 03063, or call (603) 880-4000.*

### Boards link Mac SE, SE/30 to thin Ethernet

**Asante Technologies, Inc.** recently announced two boards that link Apple Computer, Inc.'s Macintosh SE and Macintosh SE/30 to an Ethernet local net that also supports IBM Personal Computers and compatibles.

The **MacCon SE/E** and the **MacCon SE 30/E** connect as many as 100 Macintoshes to a thin-wire Ethernet segment that spreads a distance of roughly 1,000 feet. The cards support Apple's AppleShare; Novell, Inc.'s NetWare for Macintosh; and Sun Microsystems, Inc.'s TOPS network operating systems. Both cards comply with all IEEE 802.3 Ethernet standards and with Apple's Macintosh add-on specifications.

The MacCon SE 30/E also supports transmission over twisted-pair cable and will support a twisted-pair Ethernet networking module that Intel Corp. is currently developing.

The MacCon SE 30/E transfers data from the Macintosh to the board at a bus speed of 10.44M byte/sec. The card's multicolored diagnostic LED readout indicates whether packets are being transmitted, received or whether data collisions have occurred on the Ethernet.

The MacCon SE/E board costs $395, and the MacCon SE 30/E costs $595. Both products are scheduled to be available in May.

*Asante Technologies, Inc., 1050 E. Duane Ave., Suite G, Sunnyvale, Calif. 94086, or call (408) 736-3360.*

### Software linking PC nets to TCP/IP net enhanced

**The Wollongong Group, Inc.** recently released enhanced versions of software that links personal computers to backbone Ethernet networks running the Transmission Control Protocol/Internet Protocol.

**Release 4.0 of WIN/TCP for DOS** and **Release 2.0 of WIN/Route for DOS** enable personal computers attached to Ethernets running Novell, Inc.'s NetWare or another network operating system supporting IBM's Network Basic I/O System to connect to a backbone Ethernet running TCP/IP.

WIN/TCP for DOS runs on the personal computer and works with most personal computer-based Ethernet adapter boards. The package is used to provide a connection to WIN/Route for DOS running on a file server that is attached to both the local network and the backbone Ethernet running TCP/IP.

Once connected to the backbone Ethernet, personal computers running WIN/TCP for DOS can be connected to other backbone net-attached devices running The Wollongong Group's TCP/IP software, such as a Digital Equipment Corp. VAX minicomputer running WIN/TCP for VMS.

The new release of WIN/TCP for DOS is easier to install and supports TCP/IP's File Transfer Protocol (FTP). FTP makes it possible for personal computers running WIN/TCP for DOS to exchange files with other systems supporting FTP.

The new WIN/TCP for DOS version also supports a software driver that enables the personal computer to use a single adapter board to access both a Novell NetWare network and a backbone Ethernet running TCP/IP.

Available now, WIN/TCP for DOS is priced at $395, and WIN/Route for DOS costs $149. Dis-

counts are available on 20-, 50- and 100-user licenses.

*The Wollongong Group, Inc., 1129 San Antonio Road, Palo Alto, Calif. 94303, or call (415) 962-7100.*

### Adapter board links PCs to MAP networks

**Computrol, Inc.** recently announced a new network adapter board and software capable of linking IBM Personal Computer ATs, XTs and compatibles to a network supporting the Manufacturing Automation Protocol.

The company's **Model LP-25 MAP Network Controller** works with the company's **Model MMP-35** MAP Version 3.0-compatible software and is part of Computrol's ISOcomm product line. The LP-25 board fits into the Personal Computer bus and supports Layers 2 through 7 of the MAP and IEEE 802.4 protocol.

The LP-25 is based on a Motorola Corp. 68020 microprocessor and a direct memory access (DMA) controller that frees the 68020 from DMA tasks.

The product has 1M byte of random-access memory, a Motorola 68824 token bus controller and 512K bytes of erasable, programmable read-only memory. The LP-25 also has a Motorola 68901 multifunction peripheral controller.

Computrol supports the LP-25 MAP Network Controller Board with a variety of software packages for broadband, carrierband and fiber-optic networks.

The first software packages for the LP-25 controller will support the MS-DOS operating system.

They will include the MAP protocol stack (Layers 1 to 7), File Transfer, Access and Management, and Manufacturing Message Specification.

Future MAP software releases will support the Unix operating system.

Pricing for the LP-25, which is currently being beta-tested, has not been set.

*Computrol, Inc., 239 Ethan Allen Highway, Ridgefield, Conn. 06877, or call (203) 431-2000.*

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Jitter contribution of 24-gauge twisted pair cables with 6 to 7 mils of insulation.

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### Software links Macs to VAXes running Ultrix

**Pacer Software, Inc.** recently introduced software that enables users of Apple Computer, Inc.'s Macintoshes to access files stored on a Digital Equipment Corp. VAX running under Ultrix, DEC's version of Unix.

**PacerShare** software allows a VAX minicomputer running Ultrix to act as a file server for a network of Macintoshes linked to an Ethernet local network.

The software makes Ultrix files on the VAX appear as if they were Macintosh files, allowing them to be accessed in the same way as Macintosh files.

Ultrix users, on the other hand, access files using a standard Unix interface.

PacerShare resides on a VAX, MicroVAX or VAXstation computer that is also running Apple's AppleTalk networking protocols.

PacerShare works with Macintoshes running Apple's AppleShare client software and linked to an Ethernet.

Licensing of PacerShare ranges from $2,400 for five concurrent user sessions on the VAX to $45,000 for 500 concurrent sessions. The software is available now.

*Pacer Software, Inc., 7911 Herschel Ave., Suite 402, La Jolla, Calif. 92037, or call (619) 454-0565.* ◼

## Mux supports 14 T-1 circuits

continued from page 35

ables users to embed multiple 2,400 bit/sec, 4.8K bit/sec or 9.6K bit/sec data channels onto a single 56K bit/sec DDS circuit.

The Accustream 1000 can be configured to support full redundancy. This means users must install a backup board for each board in the cabinet. When a primary board fails, the backup will automatically go into operation. Achieving full redundancy requires the use of board slots that could otherwise be used to support voice or data transmission.

An Accustream 1000 supporting two T-1 circuits is priced at $6,500. A fully configured Accustream 1000, supporting full redundancy, costs $20,000.

Integrated Telecom can be reached by writing to 630 International Pkwy., Richardson, Texas 75081, or call (214) 234-3340. ◼

# OPINIONS

NETWORK MANAGEMENT

BY JAMES HERMAN

## Modeling approach key to success for IBM's repository

Within the next four months, industry watchers expect IBM to announce new network and system management applications that have been grouped under the code word "repository." The purpose of these new applications is to organize the administrative and reporting needs of an operations center. They are expected to be designed around a data base or set of data bases containing the diverse types of information that network management applications use and generate.

If well designed, these applications will expand NetView's capabilities and transform it from a somewhat random set of tools and displays into a coordinated group of applications that meets much wider needs. Potentially, the repository could move IBM configuration specifications away from the current Stone Age technique of batch system generations, or sysgens, to a more dynamic, data base-driven approach.

The repository is designed to be the foundation of a new set of problem, change and inventory management applications. Connected to each element in the repository will be a history of that element's problem and change activity, as well as performance profiles. One of the major reasons for including a full-scale data base management system in the repository is to enable users to report on this historical data in a flexible, customizable way.

The repository will need to provide or interface with directories such as host and user names as well as mailbox identifications, currently a major deficiency in Systems Network Architecture networks. The repository will also contain financial and contractual data on equipment, such as date of acquisition, booked depreciation, service agreements and chargeback allocations, as well as contact information for vendor and carrier repair organizations.

The repository must do more than store factual data though; it must hold the procedural information that will be required by a new generation of expert system- and knowledge-based programs for network management. Each element to be managed will require codification of the commands it can execute and a description of the types of testing and fault-isolation procedures that apply to it.

If successful, the repository will unify current capabilities and enable the development of an entirely new set of integrated applications for IBM network and system management. To achieve this, the repository must be based on a data model that is general enough to encompass all the different types of necessary information. It will also provide an explicit definition of network management data elements to serve as the basis for multivendor information exchange.

The Open Systems Interconnection efforts to define standards for information exchange between different vendor management systems is an object-oriented data modeling technique. The strengths of an object-oriented approach are in its generality, extensibility and ability to handle procedural and factual information. It will be surprising, however, if IBM adopts such a leading-edge approach.

Designing and implementing sophisticated applications has generally not been an IBM strength. Statements IBM has issued on the repository indicate that the company does not fully appreciate the importance of the data modeling approach to the success of the entire effort. If not based on a well-thought-out, conceptual and architectural foundation, the repository will develop into a major disaster for IBM. However, if IBM can deliver a comprehensive set of administrative and operations applications that are well integrated through the repository, it will solidify its already strong position in enterprisewide management.

*Herman writes, teaches and consults on telecommunications technology with Northeast Consulting Resources, Inc. in Boston.*

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EDITORIAL

## Report paints dismal picture for IS professionals

We've often said that networks are changing the way companies do business and that the people who run those networks have taken on a much more important role within their companies.

Given that, a study released by a London-based research firm raises some troubling issues. The study claims that, as a group, information systems professionals are poor communicators. They rarely gain in-depth knowledge of a business, the study says, and they exhibit personality traits that make it difficult for them to deal with workers in other parts of the company.

The study, "Do IS Personnel Fail in Communicating with Business Management," was conducted by Organization and Technology Research Ltd. (OTR).

It found that information systems professionals' lack of effective communications skills makes it difficult for them to explain how systems work or to design systems that meet end users' needs ("Report finds IS pros lack verbal skills," *NW*, April 24). They can't discuss technology with upper management, nor can they work with senior executives to design systems that help the company achieve its goals.

How does a company overcome this problem? OTR offers several suggestions, including appointing information systems managers with business, rather than technical, expertise. Companies can also organize mixed-discipline teams made up of workers from a variety of backgrounds to create strategic applications. That, OTR says, provides the "requisite blend of skills and personalities."

We can't agree with OTR's assessment or its solutions. The report ignores the evolving skills and talents of computer and network professionals.

The report ignores the evolving skills and talents of computer and network professionals.

▲▲▲

What's more, OTR's suggestion that managers with nontechnical backgrounds be tapped for the top slots in network organizations is harsh medicine for the technically trained information systems executive. It's a prescription for limited advancement and diluted influence.

There's no doubt that information systems managers in some companies have difficulty communicating with other workers and don't understand corporate goals. However, that's a problem for professionals in any field, from accounting to engineering. It's easy to become immersed in jargon and lose sight of the big picture.

But it's also true that, in a growing number of companies, information systems managers work closely with end users and upper management to discover ways that technology can be used to cut costs, improve service, offer new products and gain a competitive edge. Each week, the pages of this newspaper contain case histories chronicling how information systems managers are doing just that.

Overall, computer and network professionals are increasingly well-educated and aware of what it takes to make a business succeed.

Certainly there is room for improvement. Information systems managers need to work better with end users and senior management. But it was only recently that these managers were called upon to do so. Over time, the lure of recognition, promotion and increased status will encourage most information systems professionals to develop executive skills that augment their technical expertise.

Information systems managers are responding to the challenge of self-improvement and we applaud their efforts.

We'd like to hear your views on this issue. Drop us a letter at the address above or send us an electronic mail message at MCI Mail (346-0258). Or call the editor at (800) 343-6474, ext. 722.

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# QUALIFICATION FORM

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## C. Please Answer ALL Questions, Sign & Date the Form.

### 1. Industry: (check one only)

01. ☐ Manufacturers (other than computer/communications)
02. ☐ Finance/Banking
03. ☐ Insurance
04. ☐ Real Estate
05. ☐ Healthcare Services
06. ☐ Legal
07. ☐ Hospitality
08. ☐ Retail/Wholesale Trade
09. ☐ Transportation
10. ☐ Utilities
11. ☐ Education
12. ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
13. ☐ Government State/Local
14. ☐ Government Federal
15. ☐ Military
16. ☐ Aerospace
17. ☐ Consultants (independent)
18. ☐ Carriers
19. ☐ Interconnects
20. ☐ Manufacturers (Computer/Communications)
21. ☐ VAR/VAD/Systems House
22. ☐ Distributor, Computer Related
23. ☐ Distributor, Communications Related
24. ☐ Other ____________________

### 2. Job function (check one only)

1. ☐ Networking Management (Responsible for both voice & data)
2. ☐ Data Communications Management (Responsible for data only)
3. ☐ Telecommunications Management (Responsible for voice only)
4. ☐ MIS Management (VP,Dir,Department Head)
5. ☐ Corporate Management (Chairman, President, Owner, General Manager, CEO, CIO, VP)
6. ☐ Financial Management
7. ☐ Engineering Management
8. ☐ Consultant (Independent)
9. ☐ Other____________________

### 3. Your primary responsibility (check one only)

1. ☐ Data Networking
2. ☐ Voice Networking
3. ☐ Both
4. ☐ None

### 4. Is your network: (check all that apply)

LOCAL AREA NETWORKS
1. ☐ Local (within building)
2. ☐ Local (in a campus environment)

WIDE AREA NETWORKS
3. ☐ International
4. ☐ National
5. ☐ Regional (several states)
6. ☐ Metropolitan

### 5. Which transmission media do you use in your network: (check all that apply)

Public:
1. ☐ Switched-Based (DDD,Wats,Megacom,etc.)
2. ☐ Leased Line (not including T-1)
3. ☐ T-1
4. ☐ T-3
5. ☐ Digital Data Service

Private:
6. ☐ Satellite
7. ☐ Microwave
8. ☐ Fiber Optic

### 6. Which of the following vendors will you consider buying your PBX/Central Office Switch from in the next 12 months? (check all that apply)

| | A<br>PBX | B<br>COS | |
|---|---|---|---|
| 01. | ☐ | ☐ | AT&T |
| 02. | ☐ | ☐ | ALCATEL |
| 03. | ☐ | ☐ | CONTEL |
| 04. | ☐ | ☐ | ERICSSON |
| 05. | ☐ | ☐ | FUJITSU |
| 06. | ☐ | ☐ | HARRIS |
| 07. | ☐ | ☐ | HITACHI |
| 08. | ☐ | ☐ | IBM/ROLM Systems Division |
| 09. | ☐ | ☐ | INTECOM |
| 10. | ☐ | ☐ | MEMOREX TELEX |
| 11. | ☐ | ☐ | MITEL |
| 12. | ☐ | ☐ | NEC |
| 13. | ☐ | ☐ | NORTHERN TELECOM |
| 14. | ☐ | ☐ | SIEMENS |
| 15. | ☐ | ☐ | STROMBERG-CARLSON |
| 16. | ☐ | ☐ | TOSHIBA |
| 17. | ☐ | ☐ | OTHER |

### 7. What operating systems do you utilize? (check all that apply)

1. ☐ CICS
2. ☐ IBM DOS
3. ☐ MVS
4. ☐ UNIX
5. ☐ VM
6. ☐ VMS
7. ☐ OTHER ____________

### 8. Please indicate by vendor the number of mainframes/minicomputers installed in your network.

| VENDOR | MAIN-FRAMES A | MINIS B |
|---|---|---|
| 01. DEC | | |
| 02. IBM | | |
| 03. AMDAHL | | |
| 04. AT&T | | |
| 05. HONEYWELL BULL | | |
| 06. NCR | | |
| 07. DATA GENERAL | | |
| 08. WANG | | |
| 09. HEWLETT PACKARD | | |
| 10. PRIME | | |
| 11. TANDEM | | |
| 12. UNISYS | | |
| 13. CONTROL DATA | | |
| 14. OTHER | | |

### 9. Please indicate by vendor the number of microcomputers:

A) Presently installed in your network.
B) The approximate quantity you plan to install in the next 12 months.

| MICROCOMPUTER VENDOR/ WORKSTATION | PRESENTLY INSTALLED A | PLAN TO INSTALL NEXT 12 MONTHS B |
|---|---|---|
| 01. COMPAQ | | |
| 02. PCs based on 80386 chip | | |
| 03. IBM (PC,XT,AT) | | |
| 04. IBM (PS/2) | | |
| 05. APPLE (Macintosh) | | |
| 06. AT&T | | |
| 07. SUN | | |
| 08. APOLLO | | |
| 09. LAPTOPS | | |
| 10. OTHER | | |

### 10. What is your host network architecture? (check all that apply)

1. ☐ SNA
2. ☐ DECNET
3. ☐ OSI
4. ☐ GOSIP
5. ☐ MAP/TOP
6. ☐ OTHER ____________

### 11. What is your LAN Operating System? (check all that apply)

01. ☐ 10NET
02. ☐ 3COM (3+, 3+open)
03. ☐ APPLETALK
04. ☐ BANYAN (VINES)
05. ☐ DCA (IRMALAN)
06. ☐ IBM (OS/2 EXTENDED EDITION)
07. ☐ IBM (PC Network)
08. ☐ MICROSOFT (LAN MANAGER)
09. ☐ NOVELL (NETWARE)
10. ☐ NOVELL (NETWARE MAC)
11. ☐ TOPS (TOPS)
12. ☐ OTHER ____________________

### 12. What is your LAN environment? (check all that apply)

1. ☐ Token Ring
2. ☐ ARCNET
3. ☐ Ethernet
4. ☐ Starlan
5. ☐ Other____________

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### 13. What is the scope of your involvement in purchase decisions for Network/Communications produ + services? (check all that apply)

1. ☐ Organization-wide
2 ☐ Subsidiary/division wide
3. ☐ Department-wide
4 ☐ For multiple organizations (consultants)
5. ☐ Other ____________

### 14. For which network hubs outside the US do you have purchasing influence? (check all that apply)

1. ☐ Europe
2 ☐ Asia
3. ☐ South America
4 ☐ Australia
5 ☐ Middle East

### 15. Write below the total number of sites for which you have purcha influence? ☐

### 16. Check ALL that apply in columns A and B

A) I am presently involved in the purchase process for the following products/services:
B) I plan to purchase the following produc service in the next 12 months:

| | Presently Involved A | Plan to Purchase B | - COMPUTERS/PERIPHERA |
|---|---|---|---|
| 01. | ☐ | ☐ | Micros |
| 02. | ☐ | ☐ | Minis |
| 03. | ☐ | ☐ | Mainframes |
| 04. | ☐ | ☐ | Front End Processors |
| 06. | ☐ | ☐ | Terminals |
| 07. | ☐ | ☐ | Printers |
| | A | B | - SOFTWARE: - |
| 10. | ☐ | ☐ | Network Management |
| 11. | ☐ | ☐ | Micro to Mainframe |
| 12. | ☐ | ☐ | Network Security |
| 13. | ☐ | ☐ | Call Accounting |
| 14. | ☐ | ☐ | Data Base Management |
| 15. | ☐ | ☐ | Systems Software |
| 16. | ☐ | ☐ | Communications Software |
| 17. | ☐ | ☐ | Applications Software |
| 18. | ☐ | ☐ | Network Operating Systems Software |
| | A | B | - DATA COMMUNICATION |
| 20. | ☐ | ☐ | Modems (over 9.6kbps) |
| 21. | ☐ | ☐ | Modems (under 9.6kbps) |
| 22. | ☐ | ☐ | T-1 multiplexers |
| 23. | ☐ | ☐ | Other Multiplexers |
| 24. | ☐ | ☐ | Data Switches |
| 25. | ☐ | ☐ | Matrix Switches |
| 26. | ☐ | ☐ | Packet Switches |
| 27. | ☐ | ☐ | Local Networks |
| 28. | ☐ | ☐ | Protocol Converters |
| 29. | ☐ | ☐ | Network Management Syste |
| 30. | ☐ | ☐ | Terminal Emulation Boards |
| 31. | ☐ | ☐ | Facsimile Machines |
| 32. | ☐ | ☐ | Diagnostic Test Equipment |
| 33. | ☐ | ☐ | Data Service Unit |
| | A | B | - TELECOMMUNICATIONS |
| 40. | ☐ | ☐ | PBXs (over 1000 lines) |
| 41. | ☐ | ☐ | PBXs (200 - 1000 lines) |
| 42. | ☐ | ☐ | PBXs (under 200 lines) |
| 43. | ☐ | ☐ | Key Systems |
| 44. | ☐ | ☐ | Automatic Call Distributors |
| 45. | ☐ | ☐ | Voice Messaging Systems |
| 46. | ☐ | ☐ | Channel Service |
| 48. | ☐ | ☐ | Short Haul Bypass Equipme (Microwave, Infrared, etc.) |
| | A | B | - TRANSMISSION SERVICE |
| 50. | ☐ | ☐ | Switched Voice |
| 51. | ☐ | ☐ | Dedicated Leased Line |
| 52. | ☐ | ☐ | T-1 |
| 53. | ☐ | ☐ | T-3 |
| 54. | ☐ | ☐ | Digital Data |
| 55. | ☐ | ☐ | Packet Switched |
| 56. | ☐ | ☐ | Centrex |
| 57. | ☐ | ☐ | Central Office LAN |
| 58. | ☐ | ☐ | Satellite |
| 59. | ☐ | ☐ | Fiber Optic |
| 60. | ☐ | ☐ | On-Line Information |
| 61. | ☐ | ☐ | Systems Integration |
| 62. | ☐ | ☐ | Network Optimization |
| 63. | ☐ | ☐ | Microwave |
| 64. | ☐ | ☐ | Cables, Connectors, Baluns |
| 65. | ☐ | ☐ | ISDN |
| 66. | ☐ | ☐ | EMail |

### 17. Estimated value of networking equipment and services:

A) Which you helped specify, recommend approve in the last 12 months?
B) Which you plan to help specify, recomm or approve in the next 12 months?

| | A | B | |
|---|---|---|---|
| 01. | ☐ | ☐ | $25 million and over |
| 02. | ☐ | ☐ | $20 - $24.9 mil |
| 03. | ☐ | ☐ | $10 - $19.9 mil |
| 04. | ☐ | ☐ | $5 - $9.9 mil |
| 05. | ☐ | ☐ | $1 - $4.9 mil |
| 06. | ☐ | ☐ | $500,000 - $999,999 |
| 07. | ☐ | ☐ | $250,000 - $499,999 |
| 08. | ☐ | ☐ | $100,000 - $249,999 |
| 09. | ☐ | ☐ | $50,000 - $99,999 |
| 10. | ☐ | ☐ | under $50,000 |

### 18. Estimated gross annual revenue o your entire company/institution: (check one only)

1. ☐ over $10 billion
2. ☐ $1 to $9 9 bill
3. ☐ $500 mil to $1 bill
4. ☐ $100 to $499.9 mill
5. ☐ $50 to $99.9 m
6. ☐ $10 to $49.9 m
7. ☐ $5 to 9.9 mill
8. ☐ under $5 mill

### 19. A) Estimated number of employees for y entire corporation: (check one in column A)

B) Estimated number of employees at t location: (check one in column B)

| | A | B | |
|---|---|---|---|
| 1. | ☐ | ☐ | over 10,000 |
| 2. | ☐ | ☐ | 5,000 - 9,999 |
| 3. | ☐ | ☐ | 2,500 - 4,999 |
| 4. | ☐ | ☐ | 1,000 - 2,49 |
| 5. | ☐ | ☐ | 500 - 999 |
| 6. | ☐ | ☐ | under 500 |

### 20. When do you plan to implement ISDN?

1. ☐ Currently testing
2. ☐ 12 - 24 months
3 ☐ 24 - 36 months
4. ☐ 36 + months
5. ☐ not implementing

9505NWW

**ANI**

BY VICTOR TOTH

# sers should not be allowed o suppress calling numbers

itomatic number identifica-
(ANI) is on the brink of be-
eleased from the common
er domain — where its use
een confined to traditional
g functions — to the world
elecommunications entre-
eurism, where imagination
ed with dollar signs knows
unds.

important issue facing the
ommunications industry is
uestion of whether end us-
hould have the right to sup-
ANI to retain the anonym-
f their telephone calls and
g practices.

nder equal access, the inter-
ange carrier demands ANI
mation from the local ex-
ge carrier to do its billing.
result, technology has
ed that allows local ex-
ge carriers to extend calling
information freely beyond
operating boundaries to
nterexchange carriers, with
nitations attached to the in-
change carriers' use of that
mation. This puts the inter-
ange carriers in control of a
ble resource of consumer
eting data — information
has only recently been re-
in connection with en-
ed 800 services.

ith the emergence of Open
ork Architecture (ONA),
exchange carriers are
t to announce five new
ucts that .offer alternative
ods of delivering the call-
arty's number. Using these
ucts, either the called party
me third party, such as an
ering bureau, can intercept
ANI of the party initiating
local call. None of these
ucts, however, is being pro-
d for inter-LATA purposes.

eanwhile, regarding the
ent telephone privacy issue,
public's attention has fo-
d on one specific ONA prod-
— the Custom Local Area
aling Services (CLASS) fea-
known as Calling Number
very (CND). Certain Bell
ating companies are now
ctively deploying CLASS
ughout central offices.

CND using CLASS has met vigorous public opposition from consumer and civil rights groups, which argue that this feature intrudes on the calling parties' presumed right not to have the number of the phones from which they are calling be displayed or otherwise identified at the other end. (More accurately, the right that is being infringed upon, if any, is the calling parties' right to anonymity rather than their right to privacy. To date, no court, legislature or regulatory body has ruled that a protectable right to calling party anonymity exists.)

In defense of the CND service, the local exchange carriers have promoted the fact that CLASS also makes possible a complementary service feature, whereby calling parties can request that their directory numbers not be delivered to called parties. CND opponents insist that, as a condition of offering CND, the local exchange carriers must also offer this calling number suppression feature, possibly even at no charge, to any subscriber upon request.

> Reliance on suppression as a means of preserving privacy is seriously misplaced.
>
> ▲▲▲

CND critics' reliance on the CLASS ANI suppression feature as a means of preserving calling party privacy is seriously misplaced. The promotion of ANI suppression as a means of gaining public acceptance of CLASS feature services is not, in the long run, in the public interest.

First, CLASS directory number or ANI suppression is a very limited capability. Available only where CLASS is available, it serves solely to protect against the CLASS CND feature.

There are at least four other existing or emerging methods of capturing calling party information, some of which can coexist with CLASS yet remain unaffected by the CLASS ANI suppression feature of the local exchange carriers. No comparable consumer option to suppress or otherwise inhibit the delivery of the calling party's number is being considered in connection with these other, equally viable delivery methods. Moreover, selective suppression of ANI delivery over Feature Group D interexchange access services — such as those used by AT&T and MCI to generate both real-time and off-line 800 ANI calling party data — is technically impossible under the present scheme of access.

Thus, those who seek to protect the status quo regarding calling party anonymity haven't done their homework. ANI suppression, as an optional CLASS feature, is neither a universal nor a totally effective solution.

Furthermore, mandating total ANI suppression is technically infeasible and would only create a false sense of security. It would do nothing to establish a legally recognizable right to anonymity as long as other methods for delivering the calling party's number continue unabated.

On the other hand, the potential for abuse should not be underestimated. Abuse can be minimized without sacrificing the opportunity for public and private gain. The solution calls for two steps: the adoption of guidelines controlling the use of ANI information, and the launching of a widespread public awareness campaign to inform callers of new limits on their calling anonymity.

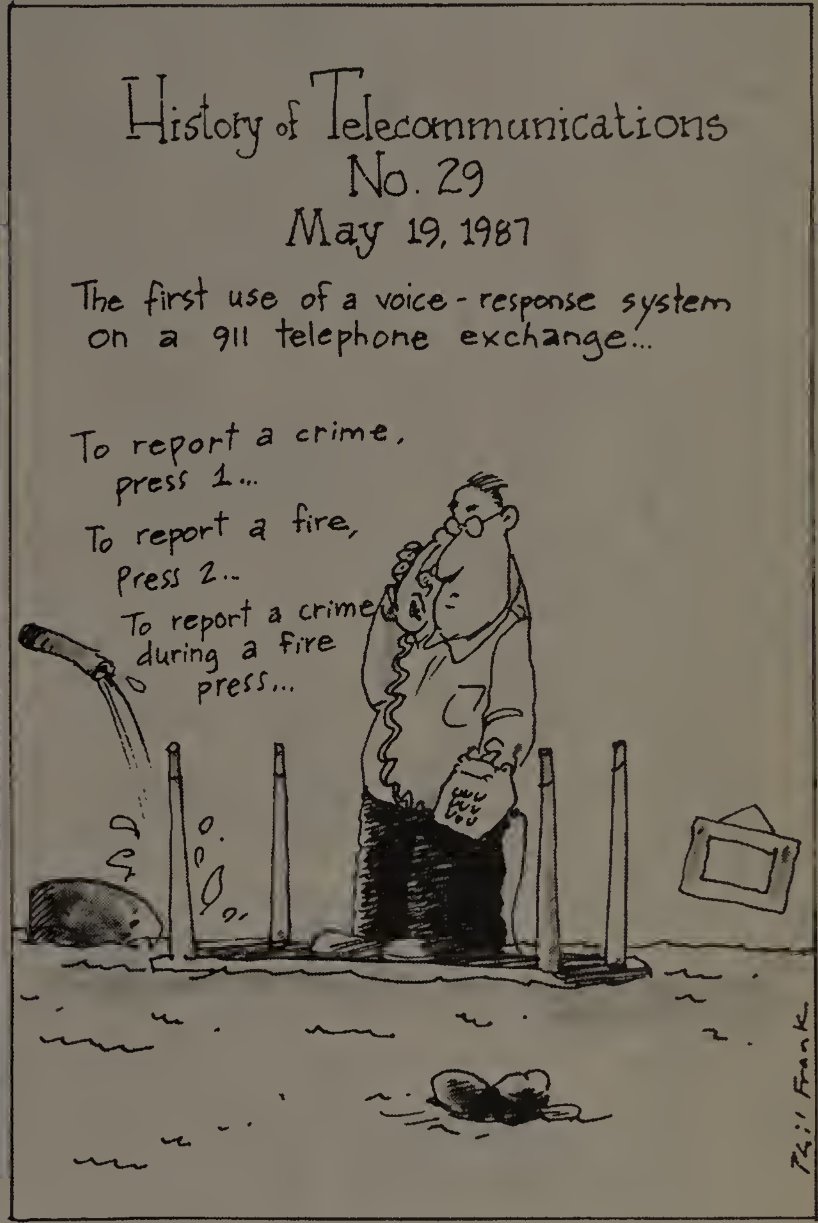
ANI capability is an exciting new telecommunications development with vast business potential that promises many public and private benefits. However, its most valuable benefits will be lost if, through the local exchange carriers, either individuals or business concerns can inhibit the transfer of ANI data on calls initiated from their telephone lines. An intelligent network with less than 100% ANI delivery capability will leave only the least desirable ANI services — such as more telemarketing applications — and thereby diminish the value of the network overall.

Therefore, for the network to achieve its full service potential, it should be a requirement that every call originating over a subscriber exchange service loop be capable of being identified by either its billing or directory number. ☑

*oth is a telecommunica-*
*s attorney based in Res-*
*Va., who specializes in*
*esenting manufacturers,*
*s, interexchange carriers*
*other competitive inter-*
*This article was original-*
*ritten as one-half of a*
*Con debate.*

## TELETOONS

BY FRANK AND TROISE


History of Telecommunications
No. 29
May 19, 1987
The first use of a voice-response system on a 911 telephone exchange...
To report a crime, press 1...
To report a fire, press 2...
To report a crime during a fire press...

## and another thing . . .

Any network manager worth his salt should have a hard time swallowing the story Digital Equipment Corp. is pitching for net management.

DEC recently lured reporters into a briefing to give a status update on its Enterprise Management Architecture (EMA) strategy. The spiel delivered was nothing more than party-line rhetoric.

The company says EMA is on track, but it won't disclose when it plans to introduce products. Vendors working to develop extensions of their products to EMA say DEC issued a secret schedule for product rollouts. But DEC won't share it with the public.

In essence, DEC is asking potential EMA customers to swallow its strategy whole, without knowing when the vaporous products will materialize. Any net manager writing a communications plan today shouldn't risk his neck for a vendor that won't make its delivery dates known.

Why should DEC be worried about making its plans known? It has proposed the grandest network management scheme to date. So what if IBM and AT&T upstage the DEC product rollouts? At least DEC's faithful will be able to plan accordingly. The only thing DEC has to fear is itself. If it issues shipment dates publicly, it might have to meet them. ☑

**PUT YOUR REAR IN GEAR.** Get your tuckus in a ruckus. Hope springs eternal here at *Network World* that you will one day write that column you keep talking about. Actions speak louder than words, so act, already. Write us a column that stirs up a storm of controversy.

Columns should be timely, opinionated, literate, thoughtful and accurate. Manuscripts should be letter-quality, double-spaced and between 600 and 900 words in length. Disk or modem submissions are preferred.

If you'd like to write a column, contact Steve Moore, features editor, *Network World*, Box 9171, Framingham, Mass. 01701, or call (508) 820-2543, ext. 732.

# A man of many parts

## Former FCC Chairman Dick Wiley wants deregulation, competition and free trade — but not right now.

It's been a dozen years since Dick Wiley had any official voice in the nation's telecommunications policy, but he's still influential in the communications industry. He began with the Federal Communications Commission as general counsel in 1970, became a commissioner in 1972 and was chairman from 1974 to 1977. Wiley started his own Washington, D.C. law firm after leaving office. Now representing a variety of communications clients, including vendors, Wiley is one of the best-known faces appearing before the FCC and congressional committees.

He's also a fixture at communications trade shows and seminars. While walking through a recent trade show, Wiley was stopped about every 10 feet by some regulator, vendor or user to chat at length about almost every aspect of communications policy and politics. FCC Commissioner Patricia Diaz Dennis, with tongue only partly in cheek, refers to Wiley as "Chairman For Life."

Wiley recently discussed industry issues with *Network World* Features Editor Steve Moore and Features Writer Bruce Guptill.

**In your opinion, is regulation of the Bell operating companies still necessary at both the state and federal levels?**

Yes to both, because of the operating companies' monopoly position.

Having said that, I don't think the Consent Decree is a forever thing. [U.S. District Court Judge] Greene has made it clear by having these triennial reviews that he looks to some evolutionary fade-out of those restrictions. But I think the fade-out is premised on some change in the marketplace realities of the [BOCs'] dominance over the bottleneck facilities that many other entities have to use to reach their customers.

As long as they've got that power, you've got to be concerned about them using it to discourage competitors in the long-distance, information services and manufacturing fields.

**Has Greene been as rigid in the implementation of the Modified Final Judgment as some say?**

I believe Greene has shown considerable flexibility and will do so in the future, again, as the evolutionary nature of these restrictions begins to play itself out.

**Can we expect the judge to retire soon? And what might happen to the Modified Final Judgment if he does?**

I think it would be hard to replace his tremendous reservoir of knowledge of this industry and his judgments in the field. I've asked him the question myself, and he answered, 'No man is indispensable.' Assuming the bottleneck power remains, another judge would come in and pick up the work, but he or she might have a different viewpoint.

By the way, the MFJ makes up only about 25% of [Greene's] total workload; he still handles regular district court duties as well.

**Is there a chance that Greene might be removed from the case through legislation?**

I don't foresee legislation to take Greene out of the process. I think there will be lots of initiatives, lots of talk and all the rest of it. But to remove a federal judge in the middle of a process — particularly when the second triennial review is ongoing — will be a tough thing to get through both the House and the Senate, particularly the Senate.

**Then is Greene's involvement still necessary?**

Yes it is. I feel that because we have that monopoly power at the local exchange, and I say that regretfully because I tend to be a free-market broker, a competitive deregulatory guy. But whether the Consent Decree was the right way to go or not, it was the way we went.

It was done with certain basic concepts in mind. One of these was that AT&T, as the parent, would operate in a competitive

*(continued on page 67)*

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The new COMPAQ DESKPRO 286e.
Further proof that what's on the outside,

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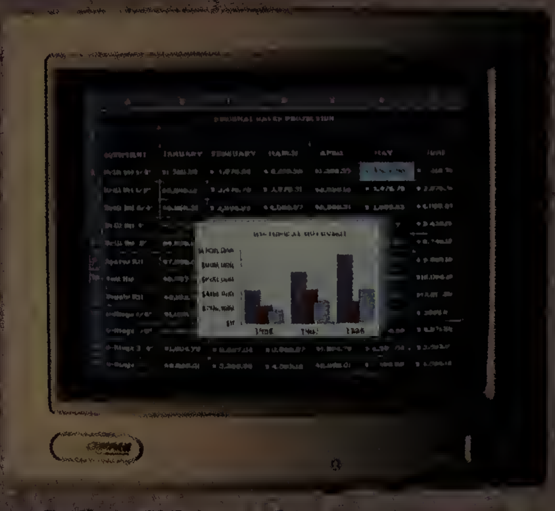
# says a lot about what's on the inside.

Compaq has earned a reputation for building the most powerful and reliable personal computers in the world.


Built-in VGA graphics run up to 50% faster than other VGA controllers.

In doing this, we've always given users the best combination of features needed to do their jobs. We've also never given up the belief that even the most basic needs deserve more than just basic solutions.

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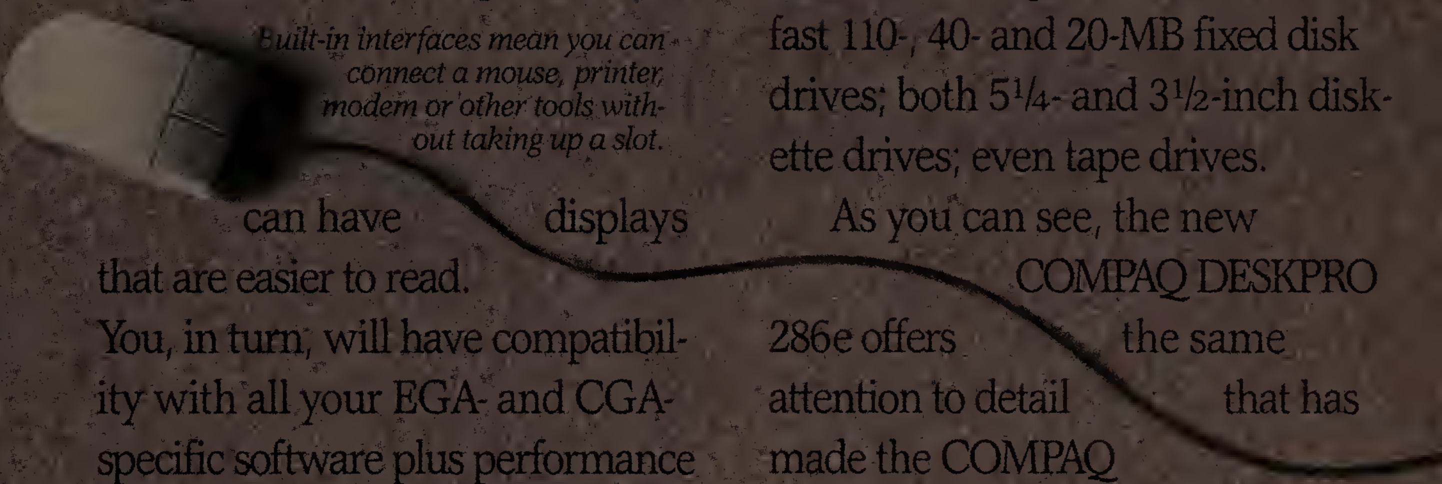
It brings together a 12-MHz 286 microprocessor and a long list of integrated features. All in a compact package that runs the latest applications, without taking up more desk space.

Five expansion slots give you room to grow: one for high-speed memory, and four for thousands of industry-standard add-ins.

Your users will find everything they need in a stand-alone PC, perfect for their growing business productivity applications.

You'll also find a PC that's been rigorously tested with a wide range of network products, so it's compatible in virtually any network environment.

Now for an inside look. High-performance VGA graphics are built right on the system board. So your users can have displays that are easier to read. You, in turn, will have compatibility with all your EGA- and CGA-specific software plus performance that's up to 50% faster than other VGA controllers.

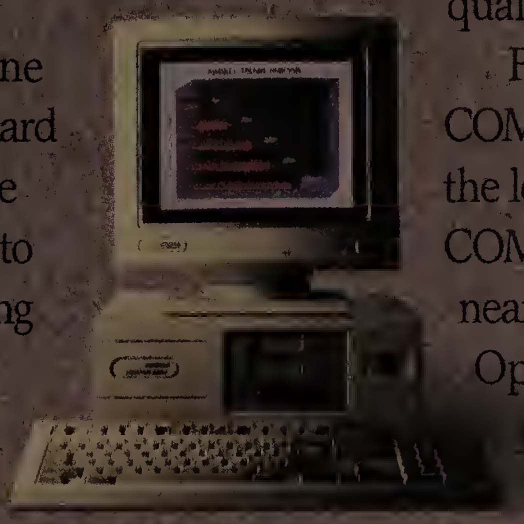

Built-in interfaces mean you can connect a mouse, printer, modem or other tools without taking up a slot.

In memory, one megabyte is standard and is expandable in increments up to 13 megabytes using a *separate* high-speed memory expansion slot. This leaves four industry-standard expansion slots open for LAN cards, mainframe links, etc. to customize the COMPAQ DESKPRO 286e to your users' needs.

You can take customization a step further. The COMPAQ DESKPRO 286e can be configured with up to four internal storage devices. Choose fast 110-, 40- and 20-MB fixed disk drives; both 5¼- and 3½-inch diskette drives; even tape drives.

You get the flexibility to use both 5¼- and 3½-inch diskette drives, along with a wide variety of high-speed fixed disk drives and tape drives.

As you can see, the new COMPAQ DESKPRO 286e offers the same attention to detail that has made the COMPAQ name unmatched for performance, quality and reliability.



For a free brochure on the COMPAQ DESKPRO 286e and the location of an Authorized COMPAQ Computer Dealer near you, call 1-800-231-0900, Operator 92. In Canada, just call 1-800-263-5868, Operator 92.

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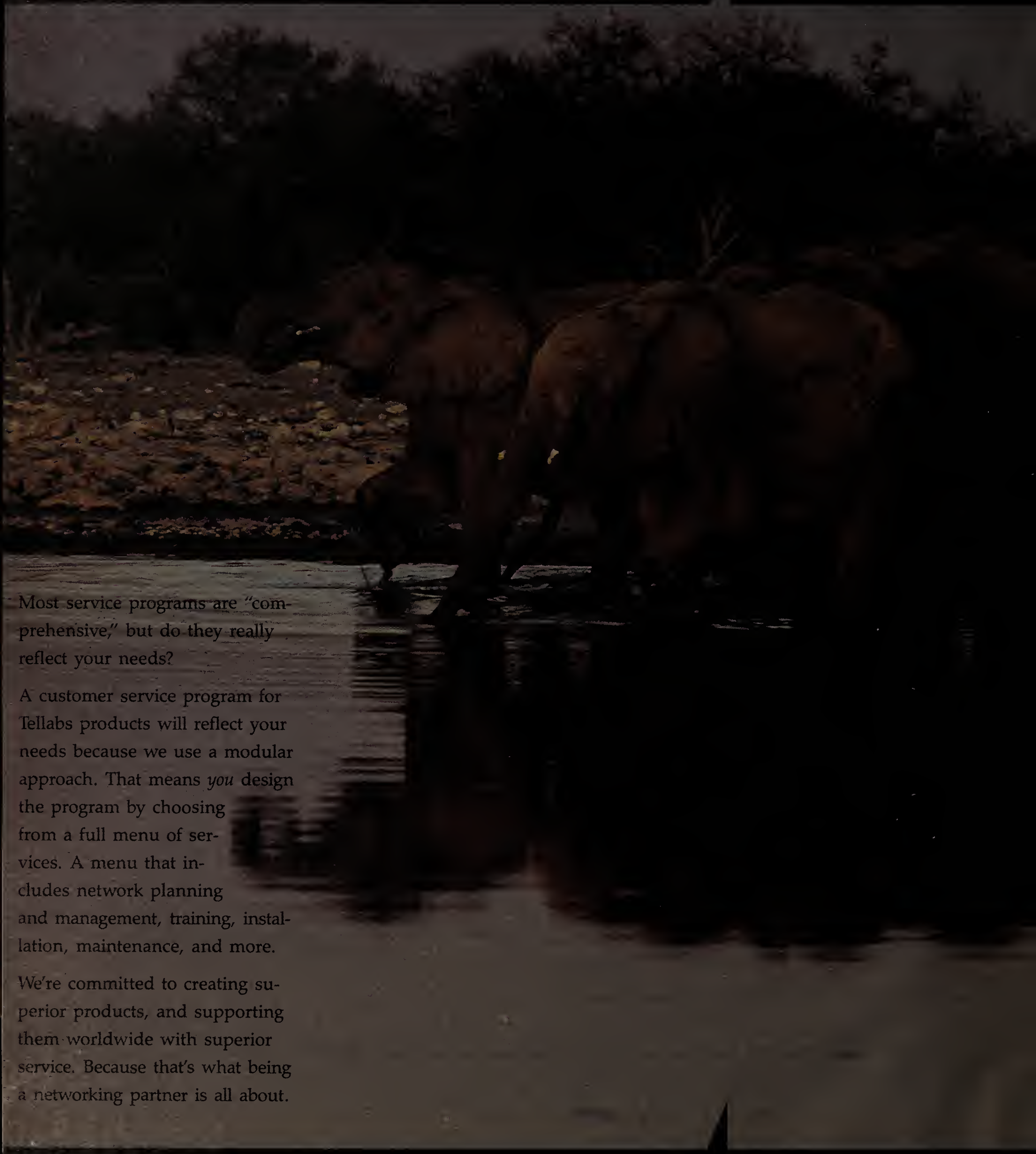

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**Management Update**
IBM networking

# It's a whole new ballgame

### IBM's Systems Application Architecture is bringing changes to cooperative processing lineups.

ILLUSTRATION ©1989 ALAN HOPKINS

FROM PAGE 1

minicomputers and personal computers. Cooperative processing within SAA is the next logical step — dividing an application into multiple processes simultaneously executing on different hardware platforms, with each process communicating with other processes across the network.

**The unifying factor**

SAA was first announced in March 1987 as a set of standards for unifying IBM's strategic hardware and operating system environments — the 370 (MVS and VM) mainframe family, the Application System/400 (AS/400) minicomputer, and personal computers running OS/2.

SAA has four components: Common Communications Support (CCS), Common User Access (CUA), Common Programming Interface and Common Applications. One goal of SAA is to permit an application written on one particular hardware/operating system environment to be easily ported to another.

Crucial SAA CCS components that support this cooperative processing model are the Common Programming Interface for Communications (CPIC), Distributed Data Manager (DDM) and SQL. CPIC provides applications with access to network session services independent of the underlying operating systems. DDM provides transparent access to data files on local or remote systems, and SQL provides a common method of generating data base inquiries across different types of data base servers.

SAA CCS also defines standard protocols for five basic layers of communications between cooperative processes: data link controls, network protocols, session services, application services and data streams.

Data link controls include Synchronous Data Link Control for point-to-point and multipoint connections, Token-Ring for local-area network connectivity and X.25 for connections across a packet-switched network. Peer-to-peer networking is supported by the network protocols between PU Type 2.1 nodes.

Session services support Advanced Program-to-Program Communications using LU 6.2. The application services include IBM's Document Interchange Architecture, Systems Network Architecture Distribution Services, DDM, Enhanced Connectivity Facilities and SNA Network Management. Three data streams are defined for SAA: the 3270 Data Stream, Document Content Architecture and Intelligent Printer Data Stream.

**SAA's implications**

One of the key implications of SAA cooperative processing is the move from 3270 dumb terminals to personal computer-based intelligent workstations running the OS/2 Extended Edition operating system.

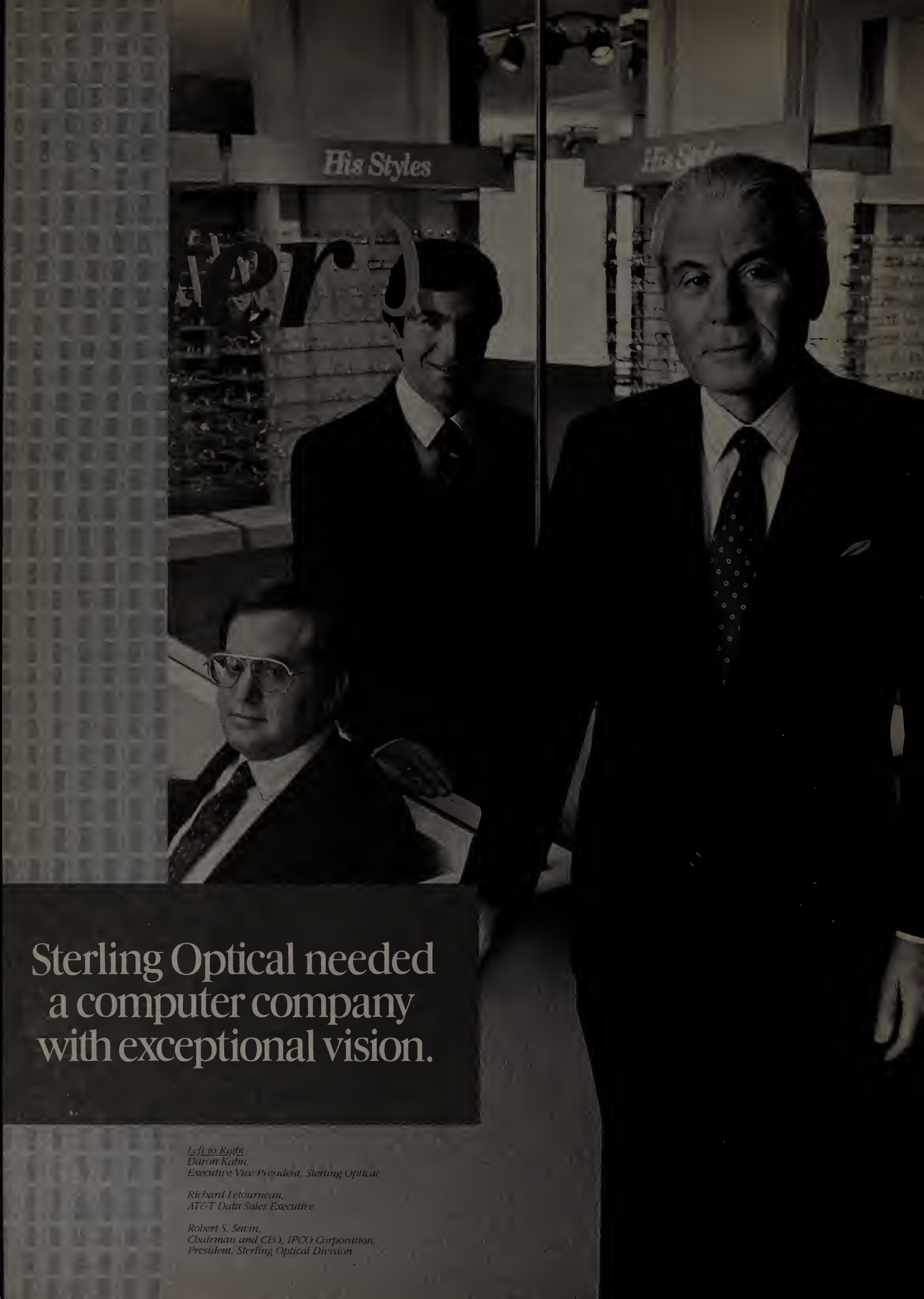
Under SAA, OS/2 Extended Edition personal computers will become the new generic workstation.

The planning process will involve extensive changes to both hardware and software. While most user organizations have already begun replacing 3270s with personal computers, their biggest challenge will be fundamentally rewriting their applications.

The hardware changes SAA dictates affect primarily workstation and network access. Each workstation will eventually need to be replaced if it is a

*(continued on page 73)*

*Chartoff is a senior manager and Passmore is a principal at Network Strategies, Ernst & Whinney's telecommunications consulting practice located in Fairfax, Va.*



Sterling Optical needed a computer company with exceptional vision.

*Left to Right*
*Daron Kahn,*
*Executive Vice President, Sterling Optical*

*Richard Letourneau,*
*AT&T Data Sales Executive*

*Robert S. Savin,*
*Chairman and CEO, IPCO Corporation,*
*President, Sterling Optical Division*

# Chesterfield, Missouri
# February 28, 1989

Sterling Optical, one of the leading optical chains in the country, was looking for a way to get a jump on their competitors in the retail eyeglass and eyecare marketplace. Sterling Optical's Bob Savin, Daron Kahn and AT&T's Rich Letourneau discuss how AT&T developed an open systems-based, retail point-of-sale system to network their 250 stores nationwide.

**Sterling:** We were getting frustrated by the delays we were facing with the old way of doing things. Our customers were unhappy, we were unhappy, and headquarters wasn't able to keep up with the volume of requests. We knew a highly integrated distributed networked computing solution was the only way to go.

**AT&T:** And you wanted to preserve the investments you'd already made in applications software—especially those on the System/38.

**Sterling:** Absolutely. All our RPG-coded customer records and our inventory control system are stored in the database at headquarters. The retail business is demanding—you can't afford to wait to implement brand-new technology. Plus, we don't have a very large computer programming department, and in order to develop, modify, or change corporate programs on the System/38, it's a big effort, and it takes a lot of time.

**AT&T:** That's why we built our multiuser platform based on the UNIX® System V operating system. We gave you the tools to develop new applications and get them into the mainstream of your business quickly.

**Sterling:** It made sense. We were able to keep our hardware and software *and* install AT&T 6386 WorkGroup Systems in our stores. Now, on a daily basis, we know what's selling and what's not. We even included an employee time and attendance system that feeds into our existing payroll system.

**AT&T:** And you've kept your system options open. You can modify any part of the system at any time. Like when you added the automatic pricing software.

**Sterling:** Right. I think what we like most about the system is its simplicity. Despite the complexity of the information handled, it really gives us easy access to our information. We need that to improve the profit potential of our business, and to maintain our lead in the industry.

**AT&T:** The system also provides investment protection for what you have today, and a gradual growth path to what you'll need tomorrow.

**Sterling:** One of the most striking things was AT&T's commitment to service. We came from an environment where it wasn't uncommon to be down for two to three or four days, waiting for equipment to be shipped or repaired.

**AT&T:** Our message was simple: AT&T wants your business.

**Sterling:** You were here working as much as we were. And you really listened to us. Of all the vendors we spoke to, you gave us the best proposal, the best equipment, and the best price. In fact, we're so excited about the new system, we wrote it up in our company newsletter.

**AT&T:** I heard! Can we get a copy?

**Sterling:** Sure. The only catch is, you have to read it from across the room with one eye closed.

## The Sterling Optical Computer Solution:

THE CHALLENGE:

Create a point-of-sale computer system specific to the optical retail business for the 250-store nationwide Sterling Optical chain.

THE SOLUTION:

AT&T created a UNIX System V-based network of AT&T 6386 WorkGroup Systems and AT&T 605 terminals chain-wide. At headquarters, an AT&T 3B2/500 gathers orders and information from each store daily. The system allows a smooth link between the 3B2/500 computer and the existing IBM System/38. A custom INFORMIX database management system forms the heart of the applications software.

THE RESULT:

Sterling Optical customers are getting better service. All store locations will be using one standard point-of-sale system that provides increased productivity, a friendlier working environment, and greatly enhances Sterling Optical's competitiveness in the industry.

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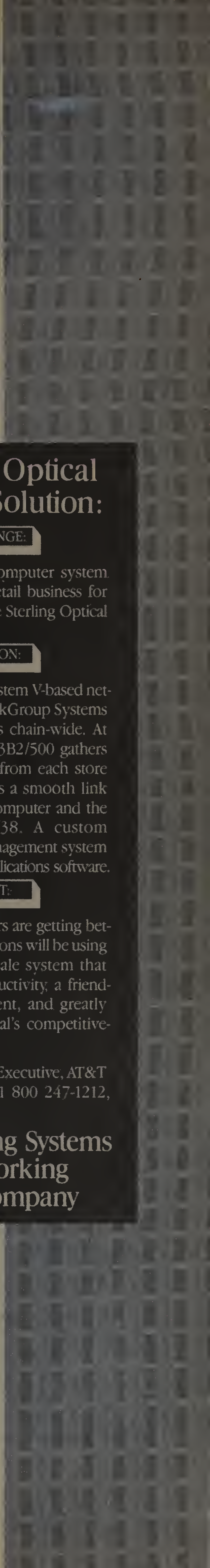

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It's unexpected, because even with the tremendous performance and economies of T1 transmission, it's only natural to worry about the worst that can happen. Downtime, plain and simple.

Now Codex helps alleviate this fear by offering the most resilient and reliable T1 product on the market today. So the worst that can happen, can't.

Introducing the Codex 6290 Integrated Digital Exchange.

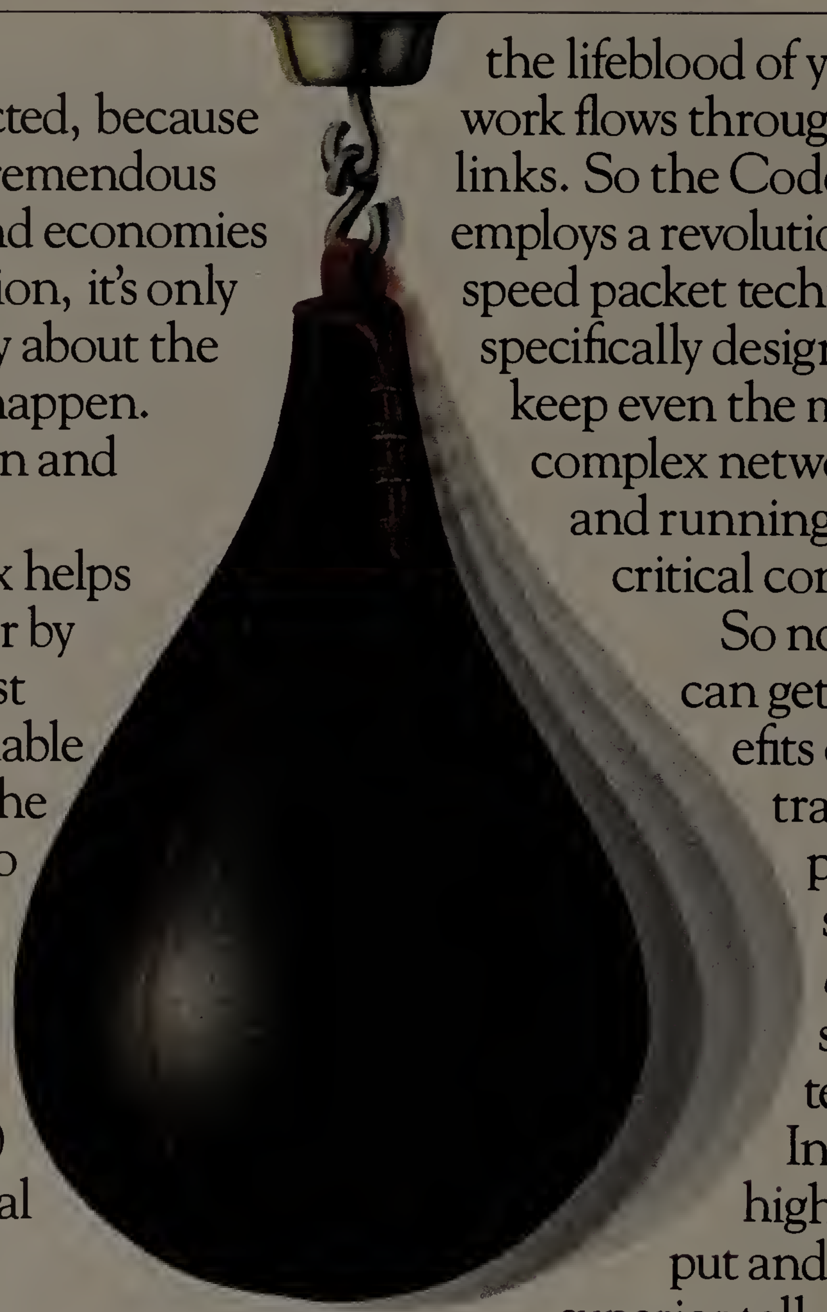
By utilizing a totally new T1 technology, Codex can now offer you both incredible reliability and incredible savings (often exceeding 30% in T1 line costs).

We understand that the lifeblood of your network flows through your T1 links. So the Codex 6290 employs a revolutionary high speed packet technology, specifically designed to keep even the most complex network up and running under critical conditions.

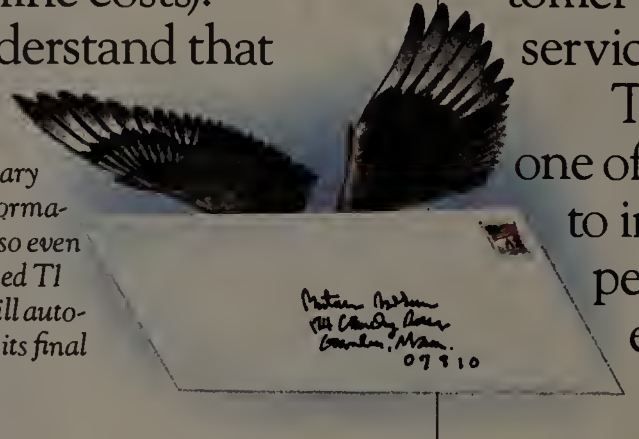
So now you can get the benefits of *both* traditional packet switching *and* circuit switching techniques. Including high throughput and superior toll quality voice transmission.

And of course the Codex 6290 is backed by our worldwide customer support and service organization.

The Codex 6290 is just one of many steps we're taking to improve digital network performance. But what else would you expect from the company with over 25 years' experience solving complex networking problems?



**Network Resiliency –**
*With an economical comprehensive redundancy scheme, self-diagnostic and self-healing capabilities, the Codex 6290 allows your system to immediately and automatically bounce back if it gets hit.*



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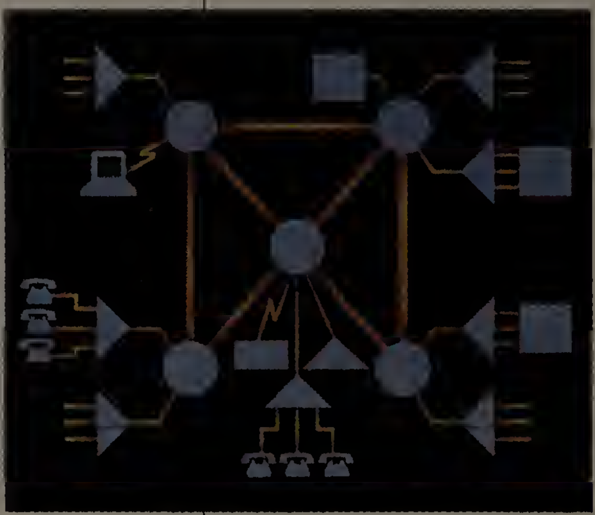

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# No longer MVP

## The rules are changing, and a veteran player will soon be out of the game.

By JOE MOHEN

The 3270's days as a major player in IBM's game are numbered. Recent enhancements IBM has made to routing mechanisms within Systems Network Architecture will function as a catalyst, precipitating major changes, not only to the role of the 3270 but also throughout the data communications industry.

Data communications professionals know that SNA has changed substantially over the past five years, as its original hierarchical structure has flattened out and become more distributed and peer-oriented (see "The history of SNA," page 50).

In its early years, SNA was deservedly maligned because it required static predefinition of applications, terminals, nodes and the links between them. Adds and changes meant bringing the network down, which meant Sunday work for systems programmers.

The first improvement, dynamic definition of both resources and routes, was made in 1980. This enabled net managers to add a new cluster controller without disturbing other users.

A more important improvement, however, was the automatic definition of routes and resources. Not only does this improvement allow the network to stay up when something is added, but the new resources will automatically define themselves.

Although only a few companies now have automatic definition, most are expected to implement it gradually over the next five years. Automatic definition is essential in very large SNA nets — those with several hundred thousand nodes. Although no network is that large now, several are fast approaching that size.

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Taken together, these changes in SNA have five major implications for users:

- **The SNA network is becoming more of a utility.** In the past, because of IBM's hierarchical approach, users had to know to which computers their terminals were connected because their node had to be dedicated to hosts only. But now, the entire SNA network is becoming more like a utility in that any user can plug into and tap any computer in the net, whether it's a host, minicomputer or microcomputer.
- **A slow decline of LU Types 0, 1, 2 and 7 is taking place.** Remote Job Entry (RJE), the prominent technology for bulk data transfer in the '70s, uses LU Type 1. The 3270 terminal used by IBM mainframes uses LU Type 2. The 5250 terminal associated with System/3Xs uses LU Type 7. Interprocess applications designed in the late '70s use a roll-your-own protocol, one that

*(continued on page 51)*

*Mohen is a Systems Network Architecture specialist and consultant based in New York.*

# The history of SNA

In its early days, IBM's Systems Network Architecture was characterized by a rigid hierarchy: an omnipotent mainframe, a front-end processor and a subservient terminal node. The relationship between the host application and the terminal was asymmetric; the host started all the sessions and did all the error recovery. The communications architecture simply reflected the economies of that day.

Three types of nodes existed then: A mainframe (a Type 5 node), a front-end processor (a Type 4 node) and a terminal controller or terminal (a Type 2.0 node). Intermediate routing did not exist. A user working on a terminal connected to Host1 could only access Host1. Period.

In the late 1970s, SNA and IBM's front-end processor software was enhanced so Type 4 nodes could do intermediate routing of sessions. And a few years later, the architecture was again enhanced so that Type 5 nodes could also perform intermediate routing of sessions on behalf of other hosts. IBM's Network Control Program was enhanced first, then VTAM.

Thus began the decade-long cycle of changing NCP, and then later VTAM, a significant and expensive redundancy.

One type of node that was not enhanced to do intermediate routing was the boundary node — the terminal controller. After all, why would dumb terminals need to go into session with one another? Someone has to do the computing. But what was really a drag was that minicomputers, each supporting the same Node Type 2.0 protocols, could not be connected to one another since the original architects did not foresee direct minicomputer-to-minicomputer communications.

**Peer nodes**

About 1982, the peer node was introduced. While the personal computer was just beginning to be accepted, it was already clear that process-to-process communications would become more important, in the long run, than process-to-terminal communications. So when LU 6.2 was born, a reworked peripheral node architecture had to be introduced with it, and thus was born Node Type 2.1.

Node Type 2.1 allowed two identical, adjacent small computers to be attached, a useful feature for small companies. A harbinger of the future appeared: Only LU 6.2 would work over a true Node Type 2.1 link. The then-popular terminal types did not use LU 6.2. Most vendors didn't grasp the implications of this.

**Network nodes**

In the mid-1980s, IBM literature began to talk about a new topic — Low Entry Networking, which would solve new problems that were emerging because both memory and processors were becoming less expensive. It became necessary to establish sessions between personal computers on various workers' desks.

Yet while Node Type 2.1 would allow this if the personal computers were hard-wired together, most were not.

Instead, like minicomputers and mainframes, they were most likely to be connected to the company VTAM network, in which sessions between peripheral nodes were excluded.

Low Entry Networking was born in a product for the System/36, called Advanced Peer-to-Peer Networking (APPN). For the first time a little computer could do intermediate routing that was actually defined by the rules of SNA. Two small Node Type 2.1 nodes could have sessions with each other using the System/36 (with APPN) as a middleman.

A key deficiency was that the cornerstone SNA products, VTAM and NCP, were essentially incompatible with APPN.

In 1988, IBM made two major changes: it enhanced NCP and, to a lesser extent, VTAM. This allowed them to support the intermediate routing of sessions between peripheral (that is, nonhost and non-NCP) nodes.

Furthermore, IBM refined APPN somewhat and then included it in the Application System/400 (AS/400). APPN is now riding the coattails of the AS/400 to wide acceptance.

*— Joe Mohen*

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*(continued from page 49)*

lacks standardized presentation services, called LU 0.

None of these logical unit types is compatible with the new routing architecture. All of these, therefore, will be phased out. This is certain; the only unknown is how quickly it will happen.

The old logical units will decline much more rapidly than most people think, partly because of the success of the Application System/400 (AS/400). Where it goes, Advanced Peer-to-Peer Networking (APPN) goes. And where APPN goes, out go the old logical unit types since they don't work with APPN.

To understand this evolution better, imagine a host connected to an AS/400, which is attached to a personal computer. IBM users often ask if personal computers can be connected to VTAM with RJE. The answer is no. They then ask if it can be done with 3270 emulation. The answer is again no. The correct answer is, "Use LU 6.2."

Another force driving the decline of the older logical unit types will be the availability of APPN on the 3174 cluster controller, which should be announced within the year.

Not all 3270s will become obsolete, only LU 2 nodes. The 3270 data stream will remain. The next generation of 3270 products from IBM will put the 3270 data stream on top of LU 6.2 so that such sessions can traverse APPN nodes.

In fact, IBM has already done this with personal computer support on the AS/400. The 5250 data stream now rides atop LU 6.2, with LU 7 no longer having strategic importance.

Systems Application Architecture documents also imply this. Furthermore, Mark Pozefsky, one of IBM's senior SNA architects, said at the recent Interface '89 Plus trade show in New York that forthcoming releases of IMS and TSO provide LU 6.2 support for this very reason.

- **Many SNA products will rapidly become obsolete.** Many current SNA products, including 3270 emulators, RJE emulators and LU 0 applications will have the rug pulled out from under them as more users find APPN's flexibility necessary. The old logical unit types depend on VTAM to do almost everything (hence they are called "dependent logical units").

A shakeout of personal computer local-area network gateway vendors is likely to occur within two years. The survivors will be those who currently provide LU 6.2 support and can move their 3270 data mapping functions on top of it quickly.

Binary Synchronous Communications RJE, which has been technically obsolete for 12 years, will still be used in electronic data interchange nets. SNA RJE will take a dive and will be almost completely replaced by LU 6.2 bulk data transfer applications.

Minicomputer makers that have not yet implemented the advanced architectures will find steep declines in their CPU sales; fitting their computers into SNA backbone networks will become more difficult. Minicomputer makers that do not support PU 2.1 are likely to suffer most.

- **More types of non-SNA traffic will traverse the SNA backbone.** IBM now offers a product called X.25 Interconnection, which allows X.25 traffic to pass over the backbone VTAM network. In the future, other types of traffic will follow suit as IBM introduces similar interconnection products. IBM is developing some products for certain proprietary architectures, as are several third parties. Eventually, all surviving proprietary architectures will be transmitted over the SNA backbone.

- **NetView interoperability will become increasingly important.** IBM will be the dominant provider of network management products in the future. As that happens, some interesting ripples will be felt.

For example, IBM will gain an increasing share of the modem market since its own modems are by far the best integrated with NetView. OSI-based network management products will finish in second place because open architectures cannot implement advanced technologies as quickly as proprietary ones.

If IBM were to commit a highly significant blunder such as failing to publish the APPN specifications, it would drive users away from SNA and toward the use of X.25 backbones. Otherwise, it appears that the SNA backbone will continue to dominate North American data communications networks. ◼

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# Unfinished business

By ALAN PEARCE

Futurists agree that the telecommunications and information industry is critical to the further socioeconomic and political development of the U.S. and, for that matter, the rest of the world. Futurists also say that information is power, so those countries that have it and disseminate it effectively and efficiently will prosper.

President George Bush says he is dedicated to promoting high-technology industries and to enhancing U.S. leadership in the telecommunications and information sector. In addition, the president's chief of staff, John Sununu is a Massachusetts Institute of Technology-educated engineer who has already informed the policy-making establishment of his determination to discuss high-tech industry issues with the president.

Sununu says he will push to free the regional Bell holding companies from the line-of-business restrictions in the Modified Final Judgment, which ended the AT&T antitrust suit by breaking up the Bell System just over five years ago.

**The FCC**

Bush is setting the wheels in motion by beginning to select his policy-making team. The Federal Communications Commission, the Department of Justice, the courts and Congress will have to tackle many issues over the next four years. In particular, the Bush-appointed FCC faces several major policy issues that have been hampering the development of the industry.

*Pearce is president of Information Age Economics, a telecommunications research firm in Washington, D.C.*

**Price caps**

Late last year, outgoing FCC Chairman Dennis Patrick attempted to push through the commission an agenda item that would have permitted AT&T to adopt price caps while the FCC launched a further rule-making on whether or not to extend price cap regulation to the local exchange companies. The item was pulled from the agenda at the insistence of senior members of Congress who said that a Bush-appointed FCC should tackle price cap policy.

The purpose of the original rule-making, launched in 1987 soon after Patrick was appointed chairman, was to pursue possible alternatives to the traditional rate-of-return regulation currently imposed on dominant

(continued on page 70)

The Bush administration, the FCC, the Justice Department and Congress have a roster of issues left over from the Reagan years.

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## FICTION

*The forces of Standards and Chaos clash again to determine which will control the Internet.*

# THE ETHER STRIKES BACK

By WILLIAM ROBINSON

*It is a dark time for the Rebellion. Though the rebels have defeated the evil Empire and created the first real data communications standards, their joy proves short-lived.*

*The forces of Chaos, led by the murderous Lord Vapor Ware, have quickly risen again. Sensing the crucial moment, Luke Netwalker has traveled to the planet Baseband to challenge Lord Vapor and, by defeating him, establish a Golden Age of Standards.*

The glowing light-saber flicked toward Luke with inhuman speed. He answered with a reflexive parry and a quick step to the right. His breath came in short gulps; his face dripped sweat.

Lord Vapor held his saber at the ready. He feinted and probed, trying to confuse the young man who opposed him. The Imperial hangar was dark and empty except for the two warriors, oblivious to all but each other. The air between them pulsed with tension and hatred.

Breath hissed in and out of the black helmet that covered Vapor's head and face. "You are strong, young Netwalker, but I am the master. Surrender to the dark side. Admit that chaos is inevitable."

"Never!" Luke cried as he charged forward with a fierce assault. Vapor retreated before the savage onslaught until he managed to regain his balance. With a few quick thrusts of his saber, he used his greater size to halt the attack.

"You still do not understand the power of the dark side," Vapor said as he clenched his black-gloved left fist and shook it at Luke. "Standards are an illusion; only chaos is real."

*Luke stood on his head amid the rain forests of the planet Datalink. He relaxed and concentrated, calling on the power of the magical Ether.*

*He reached out with his mind, connecting to a process, then to another and then another.*

*Standing to the side, the Master watched his young apprentice join process after process. Luke grabbed the fifth process and then a sixth. Suddenly, all the processes started to handshake. Luke trembled, strained and dropped the connections.*

*The Master lowered his head and shook it slowly. "Control! You must learn Logical Link Control!"*

*Luke turned, ashamed. "Master, I'm sorry. It's just too complex."*

*"Judge me by my complexity, will you?" the Master said. "And well you should not, for the Ether is my ally, and a powerful ally it is. It binds us, brings us together; in combination, we become strong."*

*The Master held his right hand, in which he clasped his wooden walking stick, in front of his body. Then he closed his eyes and, with no obvious effort, connected a dozen processes at once. After a few moments, he relaxed and dropped the links.*

*Luke looked stunned. "I don't believe it," he gasped.*

*"That is why you fail. You must know that with standards, the world becomes one. For 200 years I have trained Osi Knights. Never has one crossed the seven-layer path to Nirvana without total faith in standards."*

Vapor attacked again. The two

(continued on page 66)

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*Robinson is the director of the University of Nevada's System Computing Services, Southern Facility, in Las Vegas.*

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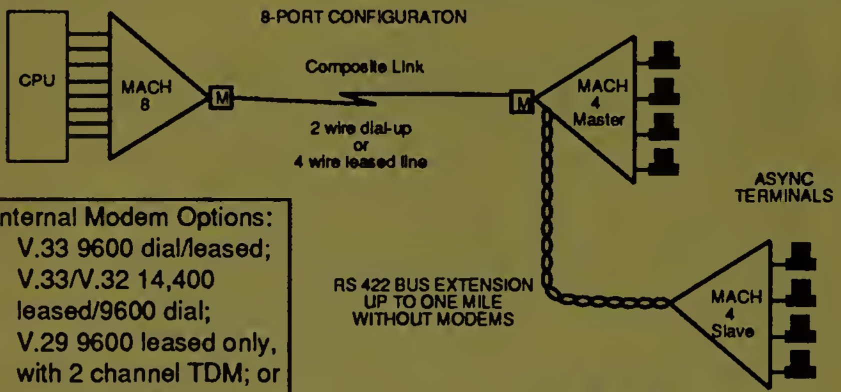
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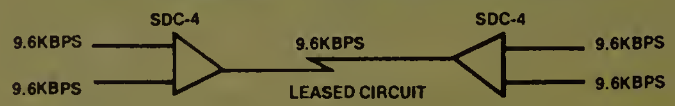

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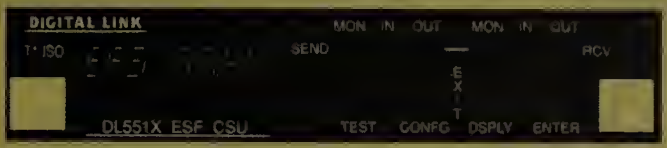

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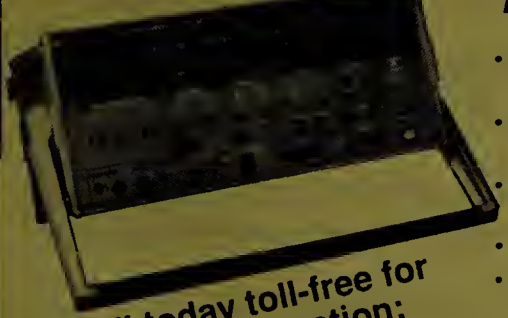

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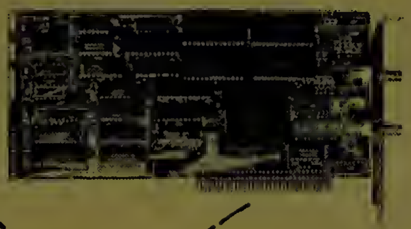

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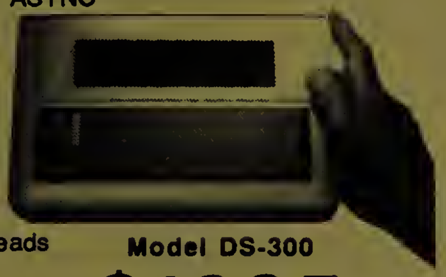

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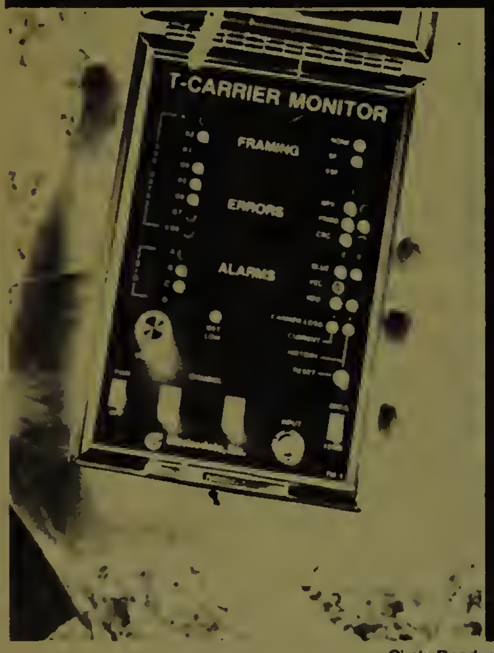

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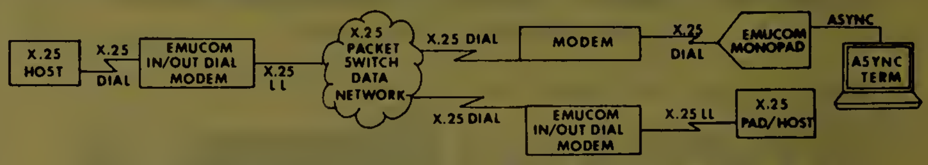

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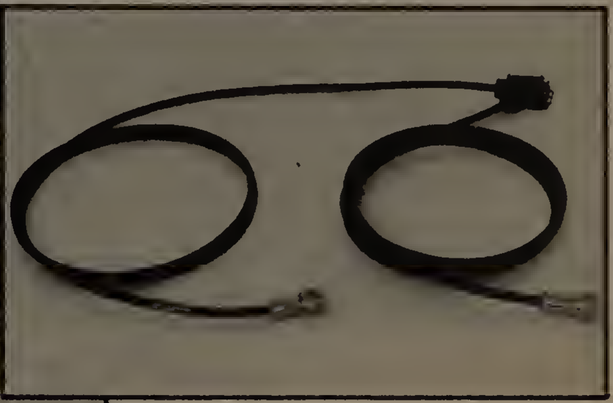

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DSA

# The Ether strikes back

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light-sabers sparked from the collision. Luke and the evil lord spun and twisted, sabers flashing, each searching for a hidden advantage to bring victory.

"If standards are unreal, why do you fear me so?" asked Luke, fighting for control of his rising anger.

Vapor laughed. "Fear? I have no fear. I wish you to join me. The Ether is too limited to threaten the Lord of Chaos. You call the Ether a standard, yet look at it. A Maker builds a system from more than just the Ether. He uses backplane buses, peripheral buses, device interfaces and a system bus. Four ways to attach a device, and the Ether covers but one.

"You dream that everyone is part of the Ether. Let it be so, and chaos will still rule. Or define a standard method of attachment for each, and we will have but a chaos of standards."

Luke was shaken by a simple truth: Should not a disk be a disk to a process, regardless of where it is? And are not all devices attached by wires of various lengths? Luke recalled his lessons. Had not his Master provided an answer?

"When you are in doubt," the Master had said, "you must return to the seven-layer path. Let it guide you."

Luke smiled and lunged toward Vapor. "The Path is the answer. A process may sit atop it and pass data down without knowing what exists below."

"And what of the Path?" countered Vapor. "You Osi Knights define the layers, but what of the links between each? You allow the Maker to define them, to build it as He decides. Chaos lives on the path; each door opens only at the whim of the Makers." Vapor flashed a savage series of thrusts. "Where is your standard now?"

Everything Luke knew was shattered. Could Vapor be so right and the Osi Master so wrong? Luke's defense slipped as his mind wandered.

"Still unsure?" Vapor asked, seeing Luke weaken. "Hook together one of your precious Ether links between boxes of different Makers. See how impotent the Ether is if the Gods of Software are not also in harmony. A standard must be made a standard at levels beyond those where the simple Ether lies."

"No!" Luke cried out in anger and frustration as he rushed toward Vapor, attacking with utter madness. Their light-sabers clashed again and again in the brutal skirmish. With each collision, fountains of sparks lit the hangar like a newborn sun.

Vapor set his feet and leaned forward. The light-sabers remained in contact until the two combatants were less than a foot apart, each braced against the other.

The Dark Lord pushed against Luke with all his unearthly might, a groan escaping him from the exertion. Luke fell backward and slid to the far wall, his light-saber falling from his hand.

Vapor hovered over him. As the living embodiment of chaos raised a gloved hand, Luke's body rose and was pinned against the hangar wall, 10 feet off the ground. Netwalker struggled helplessly against the unseen arms that held him in place.

"You Osi Knights do not understand true power. Did not your teacher tell you the Law of Ten Megabits? Ten is the number, thou shalt be no faster, nor be thou slower."

Luke was startled to hear the ancient Code of the Ether spoken by one so evil.

"Ten? Ten is nothing," the Dark Lord continued. "Ignore the rule and what is possible? Fifty? One hundred? Chaos is the stronger. Your standards limit you to what was. Generations pass while you debate changing the Code. Chaos need not wait. Today I am 50, tomorrow 70, then 100. You will be old before the Ether is set beyond your meager 10."

Luke's voice was a whisper. "No."

"Your Master never told you what happened to your father."

"He told me enough. He told me you killed him."

"I am your father."

Luke's jaw dropped.

"Search your feelings; you know this to be true. Join me and together we can end this destructive conflict and rule the Internet as father and son."

Luke screamed in anguish as the truth of Vapor's words struck him.

"Yes, Chaos is the father of standards. Now you see the truth." Vapor lowered Luke to the ground and held out his open hand. "Come with me, my son."

Luke fought to center himself and called on every bit of training that the Master had given him. His fallen light-saber jumped from the floor and into his hand. He spun with the power of the Ether and chopped at Vapor's weapon, sending it flying into a disposal tube, where it flashed briefly and was destroyed.

Luke held his glowing saber to the chest of his disarmed enemy. Vapor's breath hissed in and out, as calm as ever. He spoke quietly, "Strike me down if you will. Chaos will not be defeated. I am but a symbol."

"I will not kill you, but I will not join you. Without the forces of Chaos, there would be no standards. Were chaos to disappear, standards would become dead, empty things bereft of change. I wish to breathe life into my standards, yet it is chaos alone that may do so. There must be standards, so there must be chaos."

Luke turned off his light-saber and hung it from its clip on his belt. He looked into the eyes of Lord Vapor. "I am an Osi Knight, like my father before me."

Luke turned and walked slowly to his ship. He settled into the pilot's chair and started the engines. Vapor stood facing the rebel fighter. Luke called the media access control center for permission to depart. He heard a voice in his head calling "Luke."

"Father," he replied mentally as he guided his ship into the night.

I'm not just providing customer support.

## A man of many parts

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environment and, therefore, be free to enter almost any business it chose. The BOCs would be local monopolies and, therefore, would be sharply restricted in permissible lines of business in order to protect competition in those market sectors. I think until we see that marketplace change, we can't do away with the market restrictions.

Having said that, I think [Greene] should be encouraged to continue to look for areas in which he can back off; I think there could be some possible alleviation of RBHC manufacturing restrictions.

I think the line between permissible R&D and permissible fabrication is difficult to discern. That might be the next area where some alleviation is coming. I think the restrictions on the long-distance telephone market will be the last to go. When you see that restriction done away with, you'll know that's the end of the decree.

**Ideally, what regulatory environment would you like to see in the telecommunications marketplace?**

The goal — and dream — is that we're going to see competition develop at all levels. And once competition develops, the theory that I operated under as chairman of the FCC and that I believe the commission still follows, is that the forces of the marketplace should substitute for regulation.

But if you don't have competition, you have to maintain regulation.

**Do you think the marketplace can foster that competition?**

Technology is giving us competition. Technology has blessed the long-distance telephone field with some [competition] and eventually, but more slowly, will bless elements of the local exchange. But that's going to be more difficult.

**Do you really believe that the industry can be fully deregulated?**

I'm not sure that we'll ever see total deregulation in electronic communications. But I think we can see — and *have* seen over the past 20 years — that you can have a competitive market, that you can pull back regulation to some extent. You do have to have safeguards, and that's a form of regulation. For example, the FCC's [Third Computer Inquiry] decision set up these nonstructural safeguards, [Open Network Architecture] being the principal one. I think it's very important that those things be real.

If there are going to be evolutionary concepts, it's very important that they just don't get to a point where the plans get approved and nothing changes beyond that.

In terms of creating that level playing field, I don't think we've got it yet.

**What new regulatory issues might be coming that people aren't thinking much about yet? For example, automatic number identification (ANI) services are generating a lot of controversy.**

With the dynamic technology we have in this country, you're going to find new services that bring with them a whole host of new regulatory problems.

One such service is high-definition television [HDTV]. That brings with it problems of U.S. competitiveness, reciprocity in trade, and questions of who is going to provide the transmission technology, whether broadcast or cable. Will there be industry coalitions formed, or will there be a new industry supplanting an old one? It's a fascinating landscape.

One nice thing, from a Washington lawyer's standpoint, is that there's always going to be lots of turmoil and transitions. And there's nothing a Washington communications lawyer likes better than turmoil and transitions.

**In addition to HDTV and ANI-type services, what else might have to be dealt with?**

One of the things that I've been working on a little bit is electronic mail, voice mail, electronic voice storage and retrieval; all the services that Judge Greene recently allowed the Bell companies to enter. It will be interesting to see whether or not they take advantage of the flexibility he has provided and move aggressively into those fields.

What also may be interesting is whether there will still be opportunity for competition in those areas, and whether there are sufficient safeguards to make certain that we don't see discriminatory, monopolistic conduct.

**What about videotex? There's been some speculation that some of the Bell companies might push it through subsidization of user terminals.**

Videotex, to date, has been a big disappointment in this country. We talk about the marvels of technology, but we have to recognize that there has to be a market for the technology before it can flower.

The position many of my clients have taken is similar to the position taken in France: The telephone company ought to be encouraged to provide the underlying transmission facilities and basic gateway services, but we don't need them to provide content. As long as they have a monopoly over the conduit, they shouldn't be allowed to provide content.

I'm not sure that the French videotex model should be the best model for our country to follow — I mean seeding the field by providing the terminals. I think we'll have a better system here because we can have intelligent terminals.

**What about manufacturing customer premises equipment?**

As Commissioner [Diaz] Dennis said, that may be a situation where you may be able to have a competitive arena. And we

*(continued on page 68)*

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*(continued from page 67)*

may see further deregulation; she's calling for some changes in the manufacturing restrictions.

**Some people say we don't have to worry about ONA because the services will be so overpriced that no one will use them. Do you think that will be the case?**

I hope that's not the case; I hope that, again, competition will drive [the pricing of] those services down to the point where they will be affordable.

The operating companies are going to have to face the fact that, because they do have monopolistic power, there are going to have to be some safeguards, and they're going to have to make those safeguards work.

**Does ONA offer a way out from under the Modified Final Judgment for the regional Bell holding companies?**

I think the plans that have been filed and largely approved by the commission to date will not convince Greene to make the changes that the companies want. I think he will see gaps in them. He will not see sufficient unbundling. He will not see sufficient price information. He will not see a level playing field on which the competitors of the RBHCs' information subsidiaries will be able to compete.

I do think, in fairness, that virtual collocation rather than actual central office collocation is probably inevitable. On the other hand, the plans I've seen on collocation in the past — for example, Bell Atlantic [Corp.'s] original [Comparably Efficient Interconnection] plan — had a real disparity between what the RBHCs were charging themselves and what they were charging others. And that type of thing is going to deter Greene and objective observers from putting much stock in the ONA plans.

I'm hoping the RBHCs are going to be smart enough to realize that this is their way out and that they've got to make this concept work, because this is the type of thing that will ultimately convince Greene to step aside in favor of the FCC. I think he'd be willing to do that if he were convinced that we could have a competitive marketplace.

**Earlier, we talked of HDTV. Steve Jobs, chairman of NeXT Computing, Inc., has said that we've already lost in HDTV. Would you buy that argument?**

I think that's probably an overstatement. But we are way behind. We've already lost in consumer electronics, and I'm not sure that high-definition television is the way to restore us in that field. This is a potentially dramatic new industry of absolutely immense proportions. When you think that all of us, over the next 10 years, may buy a sophisticated, large television set that is going to cost a good amount of money, it means there's a lot [of market influence] out there. It means programming and componentry have to be developed, sets have to be assembled and new display technologies incorporated. A lot of technology is in there.

Maybe we're not going to be big in the receiver manufacturing business again, I don't know. But if we're not, there are still lots of other areas where we can be.

I'm encouraged as an American that a consortium of 18 U.S. companies has been formed to look into the possibility of a reentry into TV manufacturing.

I think what we've got in this country is a shrinking industrial base, premised on a shrinking technological and research and development base. It's very, very serious; it can erode American leadership economically and militarily, and affect our security someday; it's something our country's leaders really need to look into.

Whether or not HDTV is really going to be the answer to all this is a question in my mind, but I think it's one industry where we lost our lead and exported our own technology. It will impact our personal computer industry and our semiconductor industry — areas where we have lost a lot. If that continues, it could affect security and defense devices in the future.

**Do you think these concerns about national security, economic health and a shrinking industrial base have gotten Congress interested in communications policy in general?**

Absolutely. This is an area in which we have great technological prowess. A lot of the products and services began here in the U.S. As they became commodities, we lost our lead because we're not very good at manufacturing. We tend not to maintain the necessary basic materials backup, the basic research backup; I think that's very serious.

I don't have the solution for it. I'm a K St. lawyer; I don't provide answers for all this. But I do think that if we only sell each other hamburgers in the future, it's going to mean a tremendous loss of jobs.

**You've said there are two avenues into the home for services: the cable company and the telephone company. Where do you think that's going to go? Will we end up with two competing sources?**

We might. I'm not sure it makes economic sense, but it may be a reality of some type of industry balance of power.

I think the telephone companies have a very tough row to hoe to get into cable. They've got to surmount the Cable Policy Act of 1984, the FCC's cross-ownership rules and the AT&T Consent Decree because cable would be an information service.

Yes, they could build their fiber-optic network, but it's going to be a big expense and they're going to want to offset that expense by providing services over it, including cable or fiber-optic television, and other video services.

One suggestion is that they do something on a common carrier basis: provide only the transmission pipeline and let ev-

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erybody else rent space from them on that pipeline. They can charge the appropriate amount to offset their expenses.

On the other hand, there may be a desire to give them some degree of service-providing capability, provided that we again have safeguards. As long as that's a monopoly pipeline, they're needed.

A dual, competitive pipeline would be great, but it's a big expense. If I were king, I could go out and say, 'We'll have one monopoly provide the pipeline but not be in the programming business.' It might be very hard to get to that, given the current industry structure: the cable industry, broadcast industry, telephone industry and even a satellite industry that all might compete in these areas.

**What's your opinion on price caps vs. rate-of-return regulation?**

Rate-of-return regulation is a black art. But no one should think that price caps are a deregulatory concept. They are heavily regulatory, certainly initially. You've got to find out how to set the rates, and that takes regulation; how to change the rates, that takes regulation; and what services to put under the caps — just a whole host of complex regulatory issues.

The FCC's plan has potential risks. One of these is that it could be a financial bonanza for the telephone companies. If that happens, there will be a reaction [by the FCC and Congress]. Also, if the telephone companies use the profits at the expense of service quality and don't keep the network up to date, there will be a reaction. But if they implement it properly, it has good potential.

The bottom line is a better regulatory mousetrap.

**With regard to all these issues of competition, how would you define a dominant carrier in terms of market share?**

That's a tough one. If the trend continues, the distinction will continue to become more difficult to draw. I would say that today, AT&T and the RBHCs still have dominant power in their market sectors.

I'm concerned about the [FCC] permitting them to have tariffs structured to serve a single customer. I have trouble with that from a communications angle as to whether that isn't discriminatory. I'm also worried about how difficult it is to have resale, which is a check of the dominant carriers' power; and I'm worried about whether you can have a fair, competitive landscape between dominant and nondominant carriers.

**Is the Communications Act of 1934 enough to do the job today? Or should it be revised or completely rewritten?**

The act was enacted before television, computers, fiber-optics and satellites — all the technological wonders developed in the last 50 years. So it's an aging statute that one would like to say could be updated.

On the other hand, it has done remarkably well because the FCC and other agencies have done remarkably well to evolve and shape policy within the general confines of the act.

The idea of writing a whole new act has been tried, and it failed. The industry is so diverse and the issues that surround it are so controversial that it's hard to do. At the same time, Congress has passed modern, competitive legislation for banks, motor carriers and railroads. Why not for telecommunications?

Before divestiture, the dominance of AT&T prevented [rewriting the act]. Since divestiture, the main issue is the very difficult one of competition vs. monopoly, of regulated and unregulated companies. There are companies on both sides of that dichotomy. AT&T and the Bell companies are in both competitive and monopoly deals, and they are being regulated and trying to become unregulated. That's making it very tough for Congress to pass legislation.

Also, Congress does not like to get caught between powerful industries. When the cable, broadcast and telephone industries all come in and say, 'We want to be the dominant force providing high-definition television,' Congress' tendency is to say, 'Go solve it yourself, and we'll enact the industry compromise.'

I don't look for legislation [rewriting the act]. I think those who want legislation are wiser to find discrete pieces, a single issue that they want to try to deal with, and get that adopted.

**What's your opinion on the state and local taxes on long-distance services?**

I'm concerned when I see state regulations stopping what I think are public interest-oriented national policies. I hope that won't happen.

I think some reasonable limitations are needed on the use of these city and state taxes. Whether they infringe on interstate commerce — interstate communications — is the test.

**Who's benefiting more from deregulation: the small users or the larger users?**

No doubt the user has been impacted tremendously, and sometimes adversely, by the telecommunications revolution. In the short run, the sophisticated big business user is doing fine. He's got more choice, he's got more innovation available to him, and he may have lower costs if he's smart and knows how to buy.

However, the unsophisticated user — the residential subscriber — has been impacted adversely in the short run, and perhaps in the long run as well — although I have high hopes that competition can bring innovation and lower costs.

The users have got to educate themselves in the new technologies and options that are available and the costs involved.

*(continued on page 70)*

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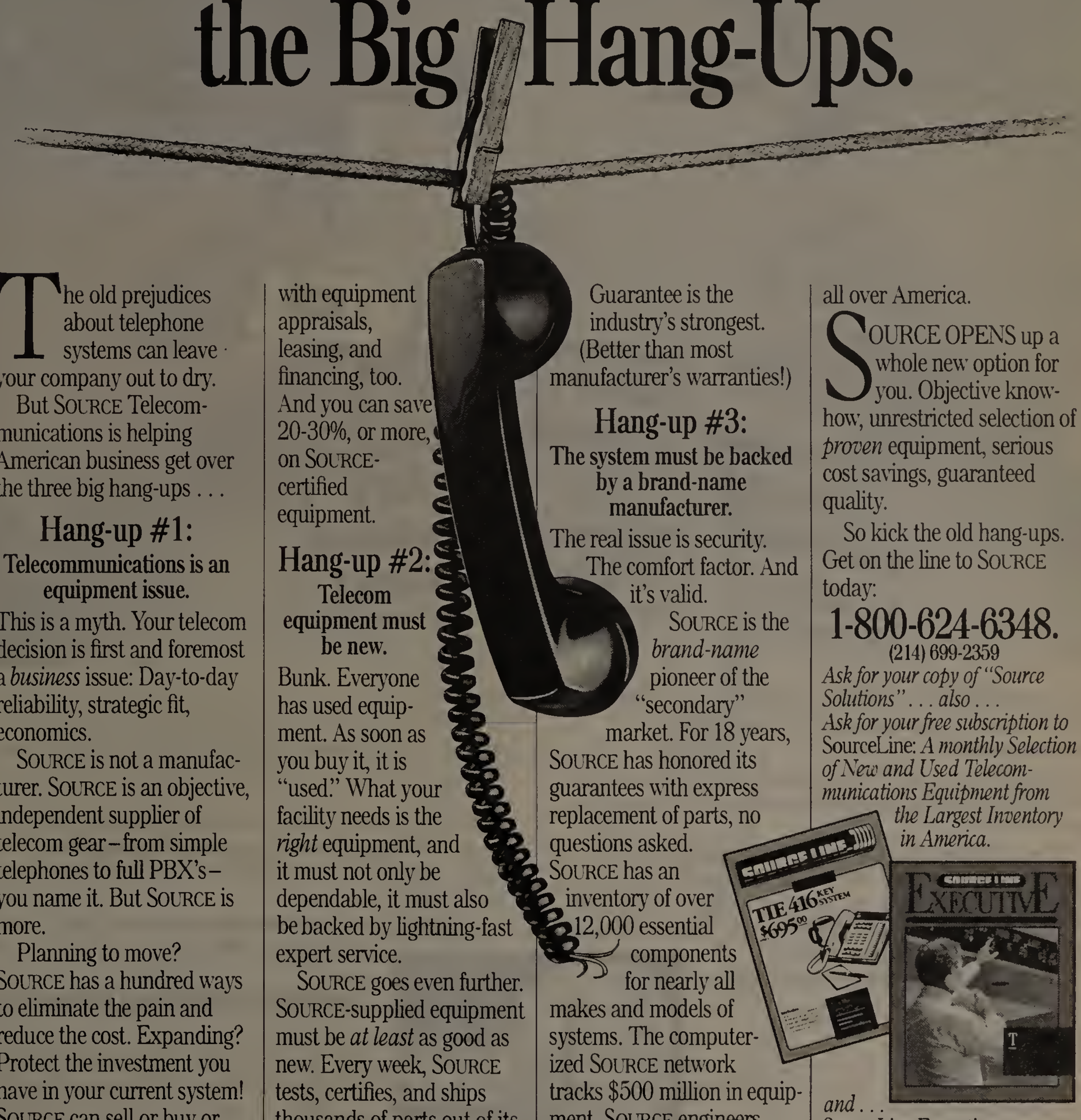

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*(continued from page 69)*

They have to increasingly protect themselves through the contractual process. Government may not be there in the future to protect them through the tariff process. Users have to get organized. I'm encouraged to see [the International Communications Association and the Tele-Communications Association, Inc.] organizing the users and bringing their voices into government circles before these major policies are established.

**What should users do to become more involved?**

Come in and see and talk to their government.

I say this against my own best interests as a Washington lobbyist, but sometimes I was more impressed as a government official by the grass roots-level guy off the street coming in and telling me how the regulation affected him. That made a big impression on me.

**Can you identify three major telecommunications issues with which the Bush administration should be concerned?**

The question of dominant and nondominant carriers is clearly going to be a major issue.

The whole question of cross-ownership — the entry of telephone and broadcasters into cable, things like that — will be second.

Third will be the use of the spectrum and how it will be divided up between competing uses. We've got a finite resource and infinite demand for it. As fiber optics grow, can we use them for some of the current uses of the spectrum?

A related question is, what will be the selection process? Will we have lotteries, auctions, comparative hearings? I like lotteries where any entity can provide the same services, and it's simply a choice between A or B.

**But has the lottery process in the cellular industry, and all the wheeling and dealing it has generated, worked in the best interest of users?**

Not particularly. I worry about the fact that, in effect, you had a lot of people who didn't have any plans to operate cellular services apply for the lotteries. It greatly complicated the system of selection.

Also, I question whether having private auctions of public resources was a good policy. I think the commission might have chosen higher qualification standards.

**What are the international issues?**

I think we may see the possibility of overcapacity in transatlantic transmission. You've got these high-capacity fiber-optic cables coming in and new satellites. It's hard to control communications when you've got too much capacity, especially when we're just on one side of the pond.

I think it's important that the executive branch be able to speak with a more uniform voice. We want to let foreign governments and investors know exactly what our policies are.

I am a proponent of continuing to export our pro-competitive policies. I think they're having an effect. At the same time, I think we have to insist on some degree of reciprocity with our trading partners so that our products are treated the same as we treat foreign suppliers. We've got to make sure everybody's playing by the same rules. That hasn't always been the case.

**With your knowledge and experience, would you return to public service — if not as FCC chairman, as some other executive branch officer?**

If they created a cabinet-level department of communications, I'd want to be first in line. I certainly would consider it, but I had the best job in the communications field one could have in my 30s. If the invitation should come, I certainly would consider it.

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## Unfinished business

continued from page 53

common carriers. Patrick claims that price caps would benefit consumers, increase efficiency and promote competition and innovation more effectively than the existing regulatory structure.

The rule-making encountered substantial opposition from consumer groups, business users, some interexchange carriers, state regulators and — perhaps most importantly — from Congress. Patrick was unable to bring the price cap order for AT&T before the FCC until he met with Rep. John Dingell (D-Mich.), chairman of the House Energy and Commerce Committee, and Rep. Edward Markey (D-Mass.), chairman of the House Telecommunications and Finance Committee.

Sen. Daniel Inouye (D-Hawaii), chairman of the Senate Communications Subcommittee, is also a price cap opponent. "We don't know exactly what price caps are since the commission has not released a working model. I will urge my colleagues to overturn any price cap order the commission might release. The price cap system is based largely on ideology," he says.

As a result of all this political pressure, Patrick had to settle for a modified price cap proposal for AT&T only; this was adopted in mid-March. The local exchange companies will have to go through yet another FCC rule-making on price caps, with no guarantees given either by the FCC or Capitol Hill. As soon as his price cap plan for AT&T was adopted, Patrick resigned, paving the way for Bush to put his policy-making team in place at the FCC.

### Tariffs

Tariff issues are closely related to price caps. Tariffs are supposed to be stringently regulated by the FCC. According to critics, however, the Reagan-appointed FCC has turned a blind eye to tariff regulation over

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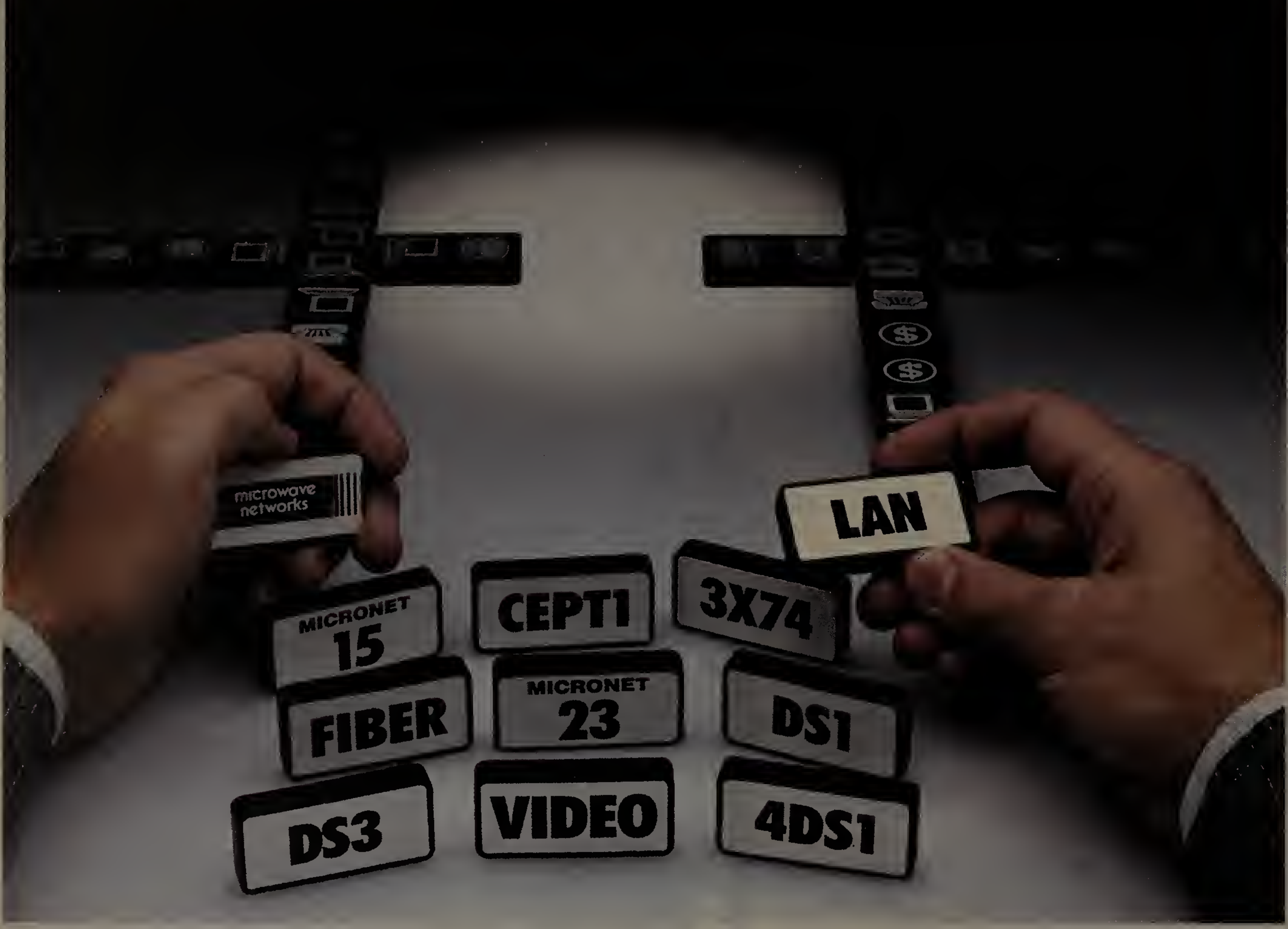

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the past several years. The Bush appointees to the FCC are expected to behave differently. Among the most important tariff controversies that will confront the Bush-appointed FCC this year and next year are:

- **Investigation of strategic pricing of special access services by the local exchange carriers.** This investigation, which will continue throughout 1989, has tentatively concluded that strategic pricing is not unlawful and that the local exchange carriers should have the flexibility to price special access services based on public policy objectives in addition to cost recovery. The flexibility granted by the FCC, however, is not unlimited.
- **Investigation of AT&T's Tariff 15 competitive pricing plans.** AT&T wants the flexibility to offer telecommunications services at customer-specific rates in response to competition. The first of these services, designed for Holiday Corp., encountered much opposition, particularly from MCI Communications Corp.
- **Investigation of AT&T's Tariff 16.** This tariff would allow AT&T to provide custom network deals to government agencies under certain circumstances.

AT&T recently won approximately 60% of the Federal Telecommunications System 2000 contract, which could be worth as much as $25 billion over a 10-year period. The contract specifies that AT&T and US Sprint Communications Co. are primarily responsible for providing federal government telecommunications services. Tariff 16 continues to be controversial and has been challenged by MCI.

As far as the Consent Decree is concerned, 1990 and beyond could see slight relaxation.

▲▲▲

- **Investigation of AT&T's Tariff 12 customer-specific integrated services.** The FCC is investigating AT&T's aggressive selling of its services and gear to the telecommunications industry's top 200 users, such as General Electric Co., E.I. du Pont de Nemours & Co., Ford Motor Co. and American Express Co.

In April, the FCC decided Tariff 12 was lawful as long as certain restrictions were lifted and AT&T made the tariff available on a universal basis. Tariff 12 will also be subject to continued regulatory surveillance by the FCC.

### Computer III

The primary purpose of the Third Computer Inquiry proceedings is to establish a new regulatory framework through which the RBHCs and AT&T can provide enhanced services or information services without the inefficiencies of the FCC's Second Computer Inquiry separate subsidiary requirement.

The centerpiece of Computer III is the RBHCs' mandatory implementation of Open Network Architecture (ONA), which is intended to provide all enhanced service providers with unbundled network access on nondiscriminatory terms. AT&T is required to implement a modified form of ONA. Until the FCC approves the carriers' ONA plans, they can offer particular enhanced services on a bundled basis — once the FCC has approved their Comparably Efficient Interconnection plans.

On Nov. 17, 1988, the FCC conditionally approved AT&T's modified ONA plan, and it also approved, in part, the ONA plans filed by the RBHCs. However, the FCC identified several areas in which the RBHCs' plans must be revised. Those revisions are required to be filed this May.

The FCC also directed the RBHCs to determine whether they can augment their initial sets of ONA services. And it asked them to continue working toward making the nomenclature of ONA's technical characteristics, as well as the availability and deployment of ONA services, uniform.

In addition, the commission ordered the RBHCs to provide three-year projected deployment schedules and to explain the manner in which they will offer ONA services through new technologies such as Signaling System 7, Integrated Services Digital Network and the Intelligent Network #2. Once the ONA plans are approved, the RBHCs have 12 months in which to implement them.

### Cross-ownership

Last July, the FCC issued a Further Notice of Inquiry and Notice of Proposed Rulemaking to review the telephone company-cable TV station cross-ownership restrictions that are included in Part 63 of the Code of Federal Regulations and Section 613 of the Cable Communications Policy Act of 1984. The restrictions generally preclude telephone companies from owning and providing cable TV service within their telephone service areas.

The FCC tentatively concluded that the construction and operation of "technologically advanced, integrated broadband networks" by telephone companies for the purpose of providing video programming and other services constitutes "good cause" for waiver of the cross-ownership restrictions. In addition, the FCC has indicated a desire to relax its current rules regarding permissible limits of affiliation between telephone companies and cable television service providers.

### Regulation or deregulation

In mid-April, after intense AT&T lobbying, the FCC announced that it would soon begin a new inquiry to determine whether AT&T should continue to be subject to stringent regulation under the Communications Act of 1934 and Volume 47 of the Code of Federal Regulations, or whether it should be given some regulatory relief.

The regulatory relief idea is being promoted by AT&T Chairman and Chief Executive Officer Robert Allen because of what he describes as evolving and intense competition in long-haul telecommunications services. This rule-making proposal, however, is controversial. Moreover, the issues addressed in it are complex largely because of AT&T's size and scale in both long-haul services and equipment manufacturing. Congress will become involved also, so early action on this rule-making is unlikely.

The FCC will consider many more policy-making issues, of course, but these will predominate over the next two to three years. Others to be tackled include a plethora of international policies, air-to-ground telephone service, mobile radio equipment standards, land mobile spectrum efficiency, private radio service licensing and mobile satellite systems.

### Greene and Justice

Both the Department of Justice and U.S. District Court Judge Harold Greene have had a tight grip on the business destinies of the RBHCs since the breakup of AT&T.

In the Modified Final Judgment, the RBHCs were forbidden from involvement in three lines of business: long-haul services, information services and equipment manufacturing.

In orders issued in September 1987 and March 1988, Greene essentially kept the line-of-business restrictions intact, except for a slight relaxation concerning the provision of gateway services. Gateway services are those by which information services providers inform the public which data bases are currently available and how to gain access to them. Greene also permitted the RBHCs to offer electronic mail and voice-messaging services, as well as electronic white pages.

Attorney General Richard Thornburgh has excused himself from taking part in the next triennial review, in part because his son is an executive at Bell Telephone Co. of Pennsylvania.

Meanwhile, the outgoing Reagan-appointed assistant attorney general for antitrust, Charles Rule, is threatening to enforce the Modified Final Judgment with "criminal prosecutions."

Consequently, 1989 may be termed a year of enforcement as far as the Consent Decree is concerned, while 1990 and beyond could see slight relaxation, depending on Greene's view of what Congress wants and whether he believes the new Bush-appointed FCC commissioners have the will to regulate the burgeoning and increasingly complicated industry.

*(continued on page 72)*

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*(continued from page 71)*

Throughout 1989 and into 1990, Greene's decisions following the first triennial review will be reviewed in appeal by the higher courts. These appeals may ultimately find their way to the Supreme Court.

**Congress**

This year, Congress is more interested in the telecommunications and information industry than it has been since the breakup of AT&T. Some members are determined to set national goals for the industry, while others are still unsure. The result? Much debate and no legislation.

Here is a summary of the legislative policy-making agenda for the next two years:

- **Legislation freeing the RBHCs from the Modified Final Judgment.** It is unlikely Congress will pass legislation designed to free the RBHCs this year. Instead, it will probably wait to see what the Justice Department and Greene come up with next year. Nonetheless, the debate will begin in earnest.

According to Gerry Salemme, chief policy adviser to Rep. Markey, "There is a growing belief on the Hill that Congress, not Greene, should set national telecommunications policy goals. The RBHCs are arguing quite convincingly that they are U.S. companies and are being discriminated against. The major unions in the industry tend to support the RBHCs' arguments. As a result, the debate over this issue will definitely begin this year."

Adds Tom Cohen, senior counsel to the Senate Communications Subcommittee, "The senators that I report to [Sen. Ernest Hollings (D-S.C.), chairman of the Commerce Committee, and Inouye] are not planning to introduce legislation at this time. I believe that they will wait for a while to see how things develop.

"If the newly appointed commissioners are more pro-regulatory, then the mood in the Senate might swing in favor of giving the responsibility for the Modified Final Judgment to the FCC," he continues. "Right now, there is great reluctance to trust the FCC of the past eight years."

David Leach, chief policy adviser to Dingell, echoed the fears of his Senate colleague. "Mr. Dingell has expressed his dissatisfaction with the lack of regulatory vigilance on the part of Congress in setting national policy goals for the industry," he says. "House leaders want to see what the Bush-appointed FCC commissioners look like before lifting the RBHCs' line-of-business restrictions."

In March, Dingell met with Hollings to discuss the telecommunications industry's legislative agenda for this year. After the meeting, Dingell said, "There's no broad congressional consensus to remove the MFJ restrictions via legislation this session. There is still strong opposition to change from those companies that have profited from the MFJ and want to keep the wraps on the RBHCs.

"In my opinion, however, public policy on this issue should be broadened to include the views of the American public," he added. "The public policy debate should not be controlled and dominated by Judge Greene."

- **Price caps.** There is still much opposition to price caps on Capitol Hill, and staffers say that if the FCC imposes a price cap policy for the local exchange companies this year, Congress will enact legislation outlawing the policy.

"Members from both the Senate and the House are suspicious of Chairman Patrick's plan to overhaul traditional rate-of-return regulation," Cohen says. "There is a fear up here that the telephone companies will retain the savings as profits or they will be passed along to the major customers at the expense of residential and small-business ratepayers."

The adoption of a price cap proposal for AT&T in mid-March was reportedly the result of a deal between Patrick and Capitol Hill leaders. As a result of Patrick's AT&T price cap victory, he resigned before further landmark telecommunications policies were adopted.

Some on Capitol Hill are saying that Patrick agreed to resign if congressional leaders allowed him to adopt price caps for AT&T.

- **Telecommunications Equipment and Services Trade.** Congress will this year be keeping an eye on the implementation and enforcement of the Omnibus Trade and Competitiveness Act of 1988. This law specifically sets forth U.S. telecommunications trade policy objectives. It establishes a framework for the removal of trade barriers and for further U.S. action in case negotiations prove unsuccessful.

The U.S. trade representative, Carla Hills, is in the process of conducting an investigation to identify "priority countries," which will be targeted for negotiations to obtain "mutually advantageous market opportunities" through bilateral or multilateral telecommunications and other trade agreements. Her report to Bush and Congress, which was filed in March, targeted a number of countries in Western Europe and Southeast Asia.

- **Telephone company/cable TV station cross-ownership.** There will be no legislation on telephone company and cable TV cross-ownership this year for two reasons. First, there is stiff opposition from the major cable TV lobby group, the National Cable Television Association, which has raised more than $1 million to fight any proposed legislation. Second, there's a wait-and-see attitude in Congress.

"Members passed the Cable Policy Act only four years ago and are reluctant to change one of the major policies of that act, namely the restriction of telephone company ownership of cable TV systems in their operating territory," Cohen says.

Leach concurs, saying, "There is just no interest in helping the local telephone companies on this one."

Nonetheless, there is growing criticism

*(continued on page 73)*

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## It's a whole new ballgame

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3270 device, or it will need to be upgraded if it is a personal computer. Personal computer upgrades will include more memory (at least 4M bytes) to accommodate OS/2 Extended Edition and personal computer-resident applications, and the use of fast Intel Corp. 80286 or 80386 processors.

IBM's Micro Channel bus architecture, implemented in Personal System/2 Models 50 and above, is currently a prerequisite for running OS/2 Extended Edition, but this is likely to change due to market pressures.

As users migrate to OS/2 Extended Edition-based workstations, 3270 displays and cluster controllers can be redeployed for applications that don't require cooperative processing, sold in the used equipment market or discarded.

While it may be difficult to migrate from this large installed base of hardware, the potential benefits users can derive from cooperative processing, in terms of improved efficiency and strategic business applications, may justify the investment.

A major network change that SAA has brought about is the replacement of 3270 coaxial cable runs from 3270 displays to cluster controllers with local-area networks. As shown in Figure 1 on page 75, several configurations are possible for connecting personal computer-based workstations back to the mainframe.

One configuration uses a token-ring local net to link personal computers to the network. The local net attaches to a 3174 cluster controller, which in turn uses an SDLC link to connect back to a channel-attached front-end processor.

A second similar configuration replaces the 3174 cluster controller with a personal computer-based server running IBM's LAN Server software or other server software from vendors such as Novell, Inc. and 3Com Corp. The server performs the gateway function from the local net to the wide-area SNA network.

In a network configuration using a remote Network Control Program communications processor (such as a 3720), the token-ring local net attaches directly to the NCP node, which provides SDLC link access to the backbone SNA network.

Especially critical to SAA implementation will be the migration of 3270 users to personal computers. Too often overlooked, training costs can have a big impact on an organization's budget. Doing more than flipping an on/off switch may be intimidating to some terminal users; proper training is a must.

Network managers should also plan for pilot tests of the new workstation environment to familiarize themselves and their staff with the local networks, protocols and new network management tools required.

At the host, users migrating to SAA have a more complex and challenging assignment. Most IBM mainframe applications were developed using the 3270 data stream, LU 2 sessions and an application subsystem such as CICS or IMS. These applications assume that there is a dumb 3270 CRT at the user's desktop. There-

*(continued on page 75)*

## Unfinished business

continued from page 72

of the cable industry from leading politicians, some of whom feel that the cable companies have dramatically increased monthly rates since they were deregulated. So the tide could turn if the RBHCs and other telephone companies get organized and launch a massive campaign against cable TV.

■ **Other mass media issues.** Hearings will begin this year on growing congressional fears of mass media conglomeration, especially in the cable TV and broadcasting segments of the industry.

The Democrats intend to pass legislation restoring the Fairness Doctrine, which the FCC abolished two years ago. The Fairness Doctrine required broadcasters to air controversial issues of public importance and to do so fairly.

Former President Reagan and his appointees to the FCC described the doctrine as a curb on free speech, whereas Democratic politicians believed that it actually enhanced freedom of speech by giving various minorities a right to have their issues and views addressed over the public airwaves.

### How it adds up

In the short term, the FCC will be the organization to watch this year and into next. At least three, and possibly four, new commissioners will be appointed during this period; and the policy-making agenda — which includes a number of important domestic and international common carrier issues — will be full.

From mid- to late-1990 through 1991, the Department of Justice and Greene will capture the policy-making spotlight as a result of the second triennial review and the spirited debate that is expected to follow.

It is clear that Greene still has most, if not all, of the power concerning the Modified Final Judgment and its future form. Only a few weeks ago, he compared the Modified Final Judgment to the Bible, suggesting that it might remain intact for some time. Perhaps only legislation will strip him of his substantial power over the industry.

In the longer term, from 1991 through 1994, Congress and the White House may seize control by mapping out policies for the future growth of the industry. This is when President Bush and his team can be expected to take charge.

As Salemme notes, "When Congress believes that the FCC can do the job, you can expect Judge Greene's role to fade away." ◻

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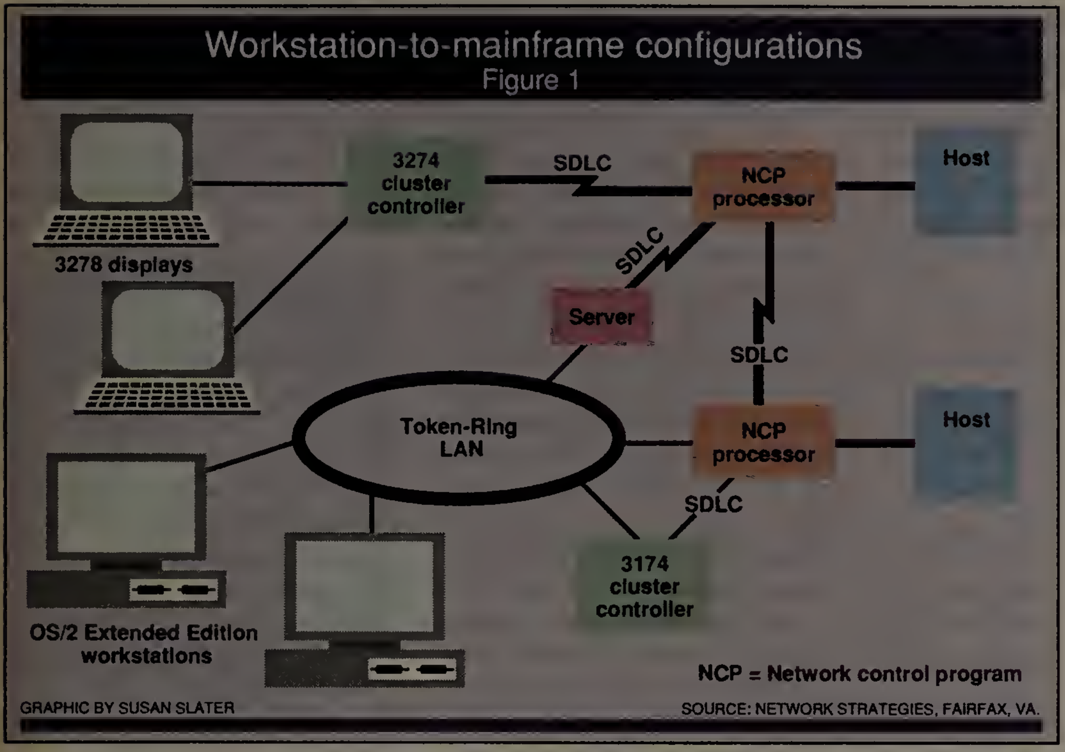
fore, all application and screen processing is performed on the mainframe.



Workstation-to-mainframe configurations
Figure 1

NCP = Network control program

GRAPHIC BY SUSAN SLATER

SOURCE: NETWORK STRATEGIES, FAIRFAX, VA.

To convert from the 3270-dominated application environment to a CPIC/LU 6.2 application environment, two major transitions must take place. The "A" section of Figure 2 on this page shows a typical configuration. Workstations consist of either 3270 displays attached to 3270 cluster controllers or personal computers emulating 3270s. The workstations communicate with the host over LU 2 sessions using the 3270 data stream. The logical unit in the host resides primarily within the application subsystem (CICS, for example). The user-written application interfaces to the application subsystem using a 3270 screen application programming interface (API).

The first transition involves efforts by both IBM and the user to achieve the configuration shown in the "B" section of Figure 2. IBM must rewrite its application subsystem products to support LU 6.2 and permit transmission of the 3270 data stream over these LU 6.2 sessions. Currently, CICS is the only application subsystem that contains LU 6.2 code. Rather than adding this capability to all other application subsystems (for example, IMS and TSO), IBM is expected to allow all of them to use the new LU 6.2 functionality recently added to VTAM.

Once this session support is in place, IBM can permit these application subsystems to transmit the 3270 data stream over LU 6.2 sessions. This will be supported for existing 3270 applications using the same application subsystem 3270 screen API. Thus, transition to the "B" configuration in Figure 2 will involve no changes to existing 3270 screen-based applications.

Workstations will also need to support LU 6.2 sessions at this time. As part of its support for SAA CCS standards, OS/2 Extended Edition will include the ability to support the 3270 data stream over LU 6.2. Thus, at this point, many organizations will begin to deploy personal computers capable of running OS/2 Extended Edition.

However, IBM will probably provide stopgap measures for those organizations that do not have personal computers that can run OS/2 Extended Edition. Microcode changes to cluster controllers may permit 3174s with displays operating in Control Unit Terminal mode to support the 3270 data stream over LU 6.2 sessions. As an alternative, IBM may also make session support of the 3270 data stream over LU 6.2 available in its more intelligent Distributed Function Terminal 3270 displays.

The second transition is more difficult because it requires a fundamental rethinking of how applications should be structured to support cooperative processing.

As shown in the "C" section of Figure 2, the old 3270 applications will be converted to CPIC/LU 6.2 applications that use the front-end/back-end concept, which takes advantage of the processing power in personal computer-based workstations.

Front-end applications are typically highly interactive, use graphical user interfaces and attempt to simplify data-entry and data-display processes for the end user. Back-end applications often run in the mainframe and are compute-intensive or support large data bases that require a host's greater processing power and disk storage capacity.

Applications must be rewritten for both the application subsystem on the host and for OS/2 Extended Edition on the workstation using CPIC/LU 6.2 APIs. The result of the front-end/back-end concept, provided via SAA cooperative processing capabilities, is more efficient use of the communications network bandwidth by minimizing the size of message exchanges required between hosts and workstations, as well as improved performance for the end user.

A key aspect of developing cooperative processing applications is learning to use the CPIC application interface effectively. Introduced by IBM in May 1988, SAA CPIC simplifies and standardizes access to LU 6.2 sessions. CPIC promises to be a major improvement over previous LU 6.2 APPC APIs, which varied from one IBM hardware/operating system platform to another.

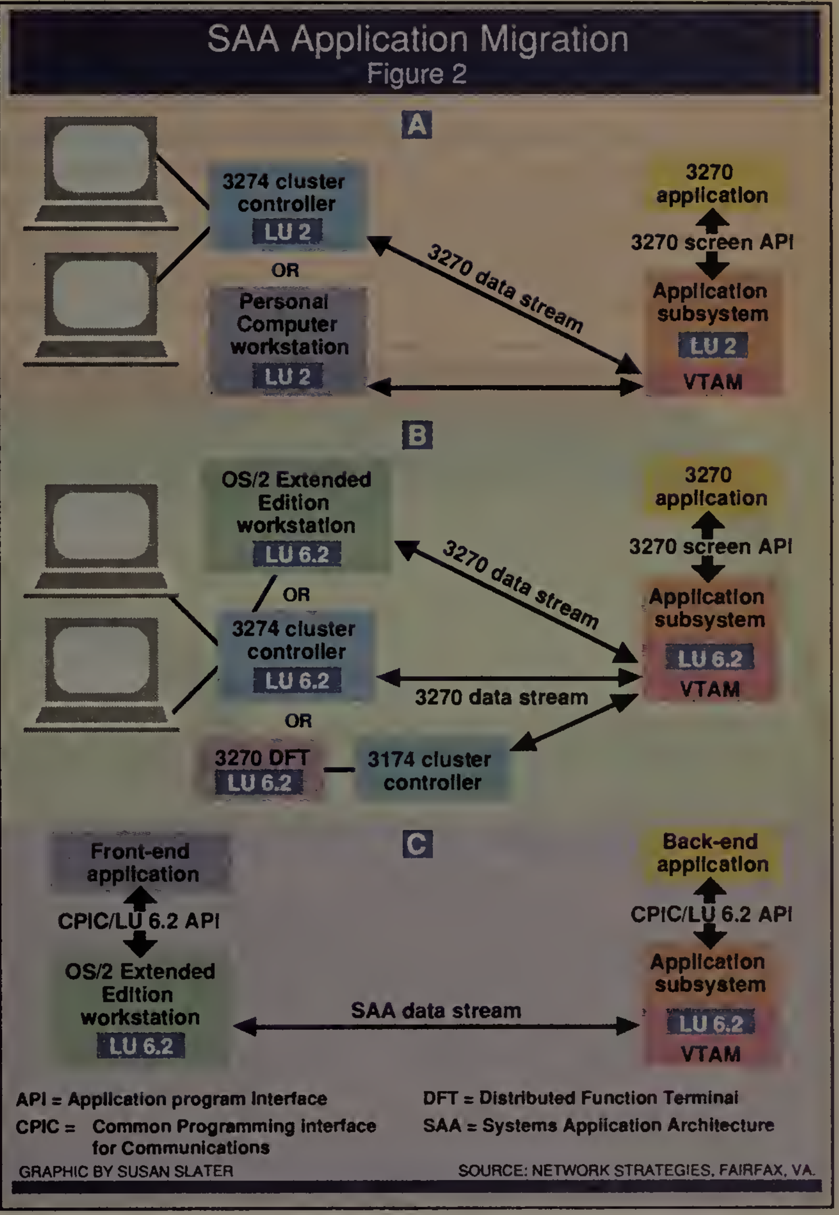
The interface between the application program and the logical unit is used by APPC application programs to issue requests for network services. These requests are defined as "verbs," or programming commands complete with parameters and return codes, such as "Send Data" or "Receive and Wait." APPC verbs are implemented differently in different IBM operating system environments and are not consistent across hardware or software platforms.

The CPIC forms an additional layer between the logical unit and the application program, which sits just outside the SNA network. CPIC reduces operating system and hardware dependencies, allowing any SAA-compliant platform — including 370 processors, AS/400s and Personal System/2s — to run the same CPIC application.

The CPIC programming interface is also easier to use than the previous LU 6.2 APPC interface. CPIC includes common naming conventions and parameter values across all implementations, something lacking in the pre-SAA world.

However, CPIC programs are incompatible with the current installed base of APPC programs; thus, organizations already using LU 6.2 applications should be prepared to modify these applications for CPIC. CPIC is currently available under VM, with support for OS/400 (the AS/400 operating system) planned for the near future; IBM has not yet announced CPIC support for OS/2 Extended Edition and MVS.

Users must realize that the implementation of SAA CCS will cause major changes in their networking and data processing environments. Therefore, they must start preparing today for new intelligent workstations, distributed applications to support cooperative processing, and new net configurations and protocols. For those committed to moving in the direction of SAA, the rewards may be worth the trip. ◻



SAA Application Migration
Figure 2

API = Application program interface
CPIC = Common Programming interface for Communications
DFT = Distributed Function Terminal
SAA = Systems Application Architecture

GRAPHIC BY SUSAN SLATER

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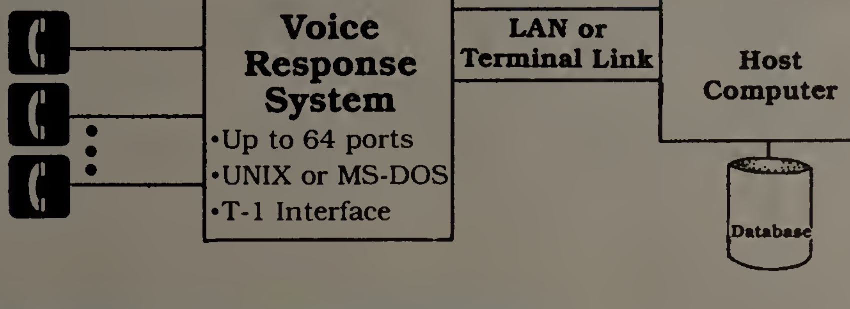

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# Net allows DMVs to track drivers

continued from page 2

practice of commercial drivers obtaining licenses from as many as 12 states. Some drivers with multiple licenses use a different license each time they are stopped for a traffic violation to avoid running up a bad driving record in any one state, Juve said.

The motor vehicle safety law mandates that all commercial drivers be relicensed by April 1992 and be allowed to have only one commercial license.

AAMVAnet, which is operated by a newly created subsidiary of AAMVA called AAMVAnet, Inc., is based on IBM's value-added Information Network. Host processors — usually mainframes — at AAMVAnet member sites are linked to the nearest node on the IBM network over leased lines varying in speed from 9.6K bit/sec for smaller users to 14.2K bit/sec and faster for larger users. Users can access the data bases through terminals or personal computers linked to the host processors.

The state motor vehicles departments are required to support IBM's LU 6.2 protocol for communications over the Systems Network Architecture-based Information Network.

Users access one data base for information on whether the driver has a license in the same or another state. If the applicant has a license in another state, more information will automatically be forwarded over the network from that state to the user.

Departments access another data base for information on an applicant's driving record. This data base, called the National Driver Register, contains files on drivers who have had "adverse action" such as a license suspension taken against them by a state motor vehicles department.

### First data base user

The California Department of Motor Vehicles recently became the first state agency to use the network for data base access. About 10 states currently are using the network to exchange E-mail and use bulletin boards. Agencies from the other states and the District of Columbia are scheduled to come on-line within 18 months.

The Federal Highway Administration paid about $7.5 million to Electronic Data Systems Corp. to create the Commercial Driver License Information System, the central repository of information on commercial driver's licenses. The government paid another $1.5 million to link the state agencies to the IBM Information Network.

"By using a value-added network, we were able to get a network together in a relatively short time without the hassles of building a nationwide backbone," Juve said.

The cost of running the net will probably be no more than 20% of what it currently costs to do the work manually, he said.

"It's expensive to get started, but once you get a network like this, you're going to use it," Juve said. One up-front cost is getting the state motor vehicles departments to employ LU 6.2 as a standard protocol.

Future applications will encourage insurance companies, automobile dealers, employers of commercial drivers and law enforcement agencies to use AAMVAnet.

AAMVAnet officials plan to build a data base that would store information about cars from the time they come off the assembly line to the time they go to the junkyard.

That would enable car dealers to trace a car's history before acquiring it and help law enforcement agencies crack down on title fraud, through which someone duplicates the title to another person's car and takes out a bank loan against it.

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# Soft-Switch offers E-mail

continued from page 6

Transfer Protocol (SMTP), which supports E-mail interchange between disparate systems on a TCP/IP net. The company's SMTP Gateway software runs under MVS or VM and lets Soft-Switch Central users exchange E-mail with Ethernet-attached devices supporting SMTP.

The VM-based SMTP Gateway requires the host to run IBM's TCP/IP for VM software and be linked to an Ethernet via an adapter for the IBM 9370 or an IBM 8232 LAN Channel Station adapter. The MVS-based SMTP Gateway requires that the host run Fibronics International, Inc.'s KNET TCP/MVS software and that it be linked to an Ethernet via Fibronics' stand-alone K200 Ethernet Control Unit adapter. Each of the SMTP Gateway versions costs $25,000.

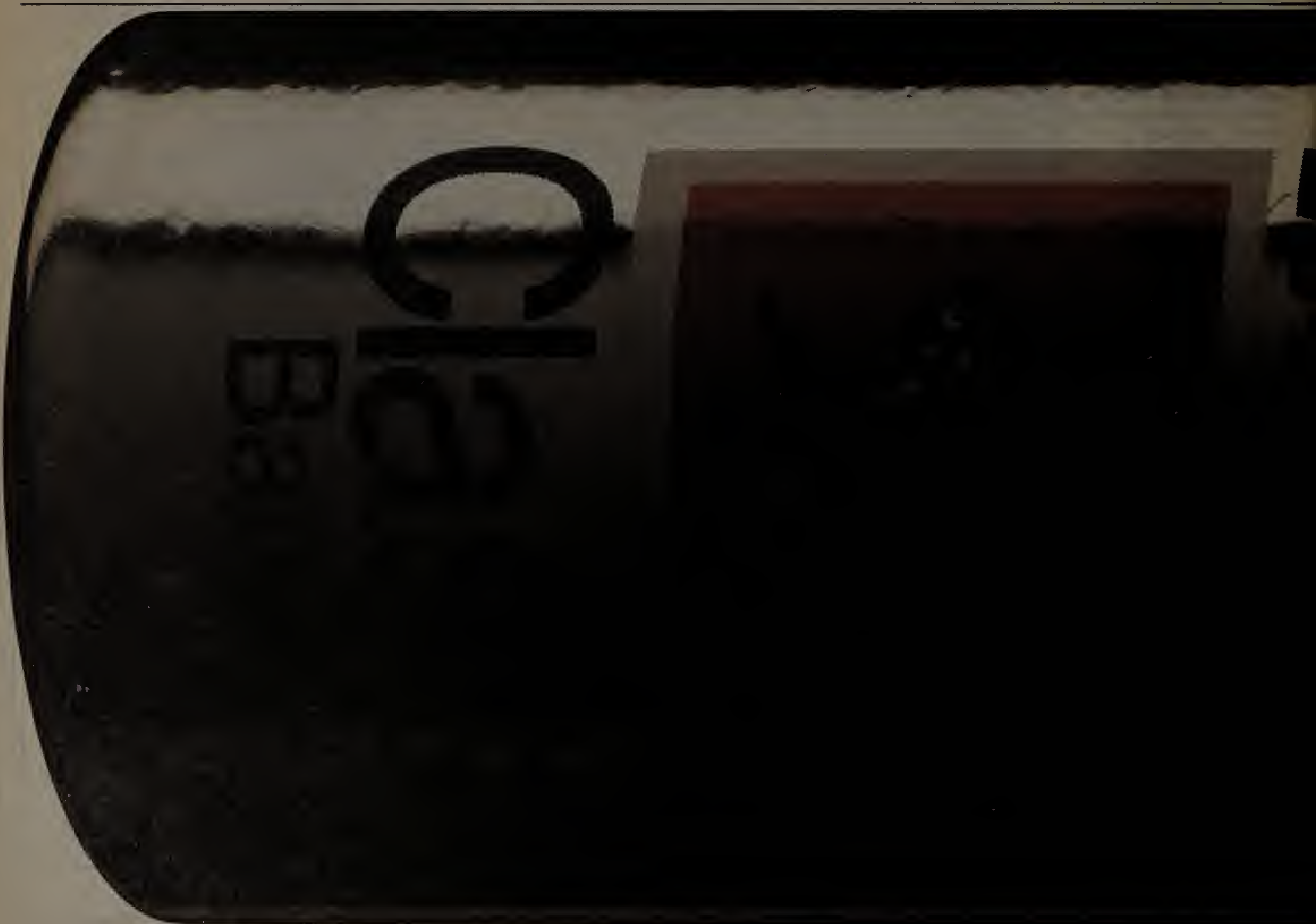
The company's new SNADS Gateway/Network Courier software runs on a 3Com Corp. or IBM Token-Ring Network-attached personal computer and communicates with Soft-Switch Central via an SDLC link supporting LU 6.2 protocols. The package ranges in price from $4,995 to $60,000.

Analysts said the announcements give Soft-Switch's products an advantage over other E-mail interchange offerings, including X.400 gateways. Users that try to link various E-mail systems by using each vendor's X.400 gateway often face interoperability problems, said John McQuillan, president of McQuillan Consulting in Cambridge, Mass.

"In today's world, you don't really have a guarantee that one vendor's X.400 is going to work with another's," McQuillan said. Since E-mail interchange is Soft-Switch's only business, it has an incentive to provide products that interoperate with other vendors' products, he said.

Soft-Switch also announced:

- Distributed Print Services software that enables Soft-Switch Central to print messages destined for users not on the E-mail net. The software costs $2,500.
- Distributed Library Services software that enables users to store finished documents, binary files or completed messages in a Soft-Switch Central library, which is similar to a data base, and retrieve them for use when needed. It costs $20,000.
- Soft-Switch Application Program Interface software that enables developers to build Soft-Switch E-mail facilities into existing applications. The software costs $5,000.



## COS kicks off program

continued from page 1

der the program include three Manufacturing Automation Protocol/Technical Office Protocol local network products.

COS certified Concord Communications, Inc.'s Series 1100 Modular Modem Card, Hewlett-Packard Co.'s OSI Express MAP 3.0 Broadband Link and Motorola, Inc.'s MC68824 Token Bus Controller. Only Motorola's controller is a new product.

Testing on a group of IEEE 802.3 Ethernet local network products is expected to be completed in June. COS eventually plans to provide Mark certification tests for all levels of OSI products.

General Motors Corp., a COS member, said it was the first user to purchase the three COS-Marked products. GM will use them in MAP pilot and lab nets.

Gary Workman, a GM staff development engineer, said that while these three products represent only a subset of the products GM would like to see certified, the company's purchases "indicate our seal of approval" of the COS Mark.

### Test centers

COS currently performs OSI conformance testing at its labs in McLean, Va., but negotiations are under way to accredit two or three independent test centers, according to Ron Cossa, manager of the COS Mark program.

Cossa said the price vendors will pay to test their OSI products will vary according to the number and types of products to be tested and whether the vendor is a COS member.

COS will also allow both member and nonmember vendors to request COS authorization so they can set up their own accredited in-house testing centers. Vendors could use the labs to test their own and other vendors' products.

Results of all outside tests must be documented and submitted to COS for approval. Cossa said COS will also conduct random audits to ensure that outside test centers adhere to COS procedures.

> "Upon request, COS will investigate claimed interoperability defaults," Faurer said.
>
> ▲▲▲

Hughes Aircaft's Huber said he is not concerned about vendor self tests. "If it's a robust, COS-authorized test, it really shouldn't matter who does it," he said. Allowing vendors to set up these authorized test centers, he added, might be the quickest way to get OSI products tested, certified and on the market.

Before the COS Mark is issued, product vendors must also sign a contract promising they will work with customers and other COS Mark product vendors to resolve "nontrivial interoperability defaults," said COS President and Chief Executive Officer Lincoln Faurer.

PHOTO ©1989 TERRY ARTHUR

In the event vendors and users are unable to resolve compatibility problems, he added, COS Mark vendors are bound to employ the COS Mark Interoperability Analysis Service. The service gives users and vendors access to COS' technical staff for assistance in resolving interoperability problems. "Upon request," Faurer said, "COS will investigate claimed interoperability defaults and render a technical opinion as to their cause."

Each individual user-vendor contract can specify the terms and conditions under which the Analysis Service may be invoked, as well as the responsibilities of each vendor, Faurer said.

Workman said the COS Mark Interoperability Analysis Service acts as "an extra insurance policy just in case something goes wrong." It could be a very valuable resource, he said. ◪

## AT&T offers wideband tools

continued from page 6

Although IACS will be available to large users, the company is targeting the devices at telephone companies. Bart Stuck, president of Strategic Business Planning Associates, a Summit, N.J., consulting firm, said telephone companies could use the IACS technology to offer a host of new services.

One application could be to use IACS services with the Integrated Services Digital Network Primary Rate Interface to link local networks.

IACS may also be suited for linking large numbers of asynchronous devices, such as automated teller machines and point-of-sale terminals, to host computers. "The question is, will the phone companies go ahead and deploy these new ISDN data services [via IACS] and get people to sign up for them?" Stuck said.

That's an open question, according to Timothy Zerbiec, vice-president of technology at Vertical Systems Group of Dedham, Mass.

"Our experience with the carriers indicates that the operations people would have a tough time accepting this technology. It's alien to them," he said. ◪

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# Racal to buy up InterLAN unit for $57 million

**By Sarah Vandershaf**
West Coast Correspondent

FORT LAUDERDALE, Fla. — Racal Corp., a U.S. subsidiary of Racal Electronics PLC of Berkshire, England, last week agreed to acquire InterLAN, Inc. from Micom Systems, Inc. for $57 million in cash.

The merger will give Racal, which manufactures modems, multiplexers and packet switches, entry into the local network market.

InterLAN, which makes Ethernet interfaces, gateways and other local net products, is a licensee of both Novell, Inc.'s NetWare and Microsoft Corp.'s OS/2 LAN Manager network operating systems. The company's revenue exceeded $50 million last year, a 66% improvement over the previous year.

InterLAN will operate as a separate subsidiary within Racal's Data Communications Operations group of companies, a Racal spokesman said.

The new subsidiary, named Racal InterLAN, will be based in Boxborough, Mass. There will be no organizational changes within InterLAN as a result of the deal, the spokesman said.

"Racal's senior management has focused on building their cellular telephone

*(continued on page 80)*

# Wall St. eyes cost-cutting custom nets

continued from page 1

The companies are looking to such tactics as negotiating custom network deals, including AT&T's Tariff 12, and consolidating facilities onto high-speed backbone networks in an effort to pare network expenditures and boost their bottom lines.

## Not so bullish anymore

The trend marks a reversal from the profitable bull market days of the mid-1980s, when Wall Street network expenditures ballooned.

"During the bull market, people pretty much got whatever they asked for in communications," said Terence McSherry, PaineWebber's vice-president for operations and systems. "Now we're under pressure to watch costs much more closely."

In part to help out its Prudential-Bache subsidiary, Prudential is looking to enter into a multiyear, custom net arrangement under which a carrier will supply all voice and private-line services at a fixed price.

"[Prudential-Bache is] hot to trot for this one," said William Rush, vice-president of information systems at the insurance company.

Rush said Prudential will benefit from volume discounts by buying all communications services from one provider. Those services are currently split between different vendors under many different contracts. Rush said the company will entertain bids from all carriers and will consider an AT&T Tariff 12 deal, although Rush said he was reluctant to get involved with the tariff given the legal issues surrounding it.

Prudential's custom network contract, Rush said, will run "into the tens of millions of dollars." He declined to be more specific.

## Cost-cutting through T-1

PaineWebber's McSherry said his firm plans to cut costs with the help of a new 10-node T-1 backbone network and tighter management controls.

"During the bull market, saving money was never a high priority," McSherry said. "Things weren't always done in the most cost-effective manner."

McSherry said the backbone, which will carry the bulk of the firm's voice and data traffic, should be completed in about 18 months. It will consolidate hundreds of 4.8K bit/sec and 9.6K bit/sec lines that the firm put up during the days before the stock market crash in October 1987.

In addition, McSherry said PaineWebber has formed a 20-person committee to scrutinize communications bills for errors, advise divisions and branch offices on how to cut costs, and try to renegotiate more favorable service contracts.

## Custom deals

Like Prudential-Bache, other brokerages are seeking to cut costs by entering into custom net deals. Both Merrill Lynch, Pierce, Fenner & Smith, Inc. and Drexel Burnham Lambert, Inc., based here, are trying to win big discounts by negotiating such deals.

According to Bruce Turkstra, Merrill Lynch's first vice-president for information systems, the company will soon award a custom network contract to either MCI Communications Corp. or AT&T. The winning carrier will handle all of Merrill Lynch's switched voice and private-line services, and it may take over responsibility for net management and ownership of the brokerage's multiplexers and two AT&T 5ESS central office switches.

The contract may be worth as much as $130 million annually, Turkstra said. He added that the deal should let Merrill Lynch save millions by getting volume discounts and off-loading its investment in equipment.

Drexel Burnham Lambert is negotiating a custom network contract with various carriers and is considering an AT&T Tariff 12 deal, according to Gerard Higgins, the company's senior vice-president of data processing and communications.

Drexel Burnham Lambert is also consolidating slower lines onto new T-1 circuits and reducing overseas operations. Higgins said these efforts will cut the company's $109 million annual communications expenditures by more than $12 million this year. ☒

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The COS Mark Program is a milestone in the information services industry. A COS Mark, placed on a vendor's product, will become as important to offices and factories around the world as other symbols have become in providing confidence to knowledgeable consumers everywhere. The vendors in the COS Mark Program are commited to meeting OSI/ISDN interface requirements. Now, users have an objective ally in the Corporation for Open Systems International (COS), as exemplified in the COS Mark Program.

COS as an independent body assists users and vendors in resolving interoperability problems through the COS Mark directed Interoperability Analysis Service. Product users can select vendor offerings bearing the COS Mark—a sign that these products have been tested in COS—accredited laboratories. Vendors who are awarded the COS Mark will have built their products to meet COS specifications thereby promoting interoperability as defined by international standards.

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## What the COS Mark Means to Vendors:

- Vendors can impact market share and accelerate the growth of OSI/ISDN markets by promoting the COS Mark Program which stimulates user confidence.
- Products awarded the COS Mark follow harmonized international standards, opening the world markets for vendor products.
- The COS Mark Program works in conjunction with global standards programs, bringing the idea of "one-stop" conformance testing closer to reality.
- The COS Mark Program adds value to products because it carries the commitment of the vendor and COS to resolve interoperability problems.

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## What the COS Mark Means to Users:

- The availability of a COS list of products awarded the COS Mark is an independent confirmation that OSI/ISDN products are available today.
- The COS Mark Program should over time reduce the users' need for complex and expensive systems integration.
- The COS Mark Program promotes greater confidence in communications product procurement. Vendors in the program are all working toward providing interoperable OSI/ISDN products.
- The COS Interoperability Analysis Service makes available an independent "third-party" problem assistance process among products awarded the COS Mark.

COS is dedicated to providing high quality conformance test systems and services of OSI, ISDN, and similar international standards. For further information on the COS Mark Program, products, services, educational offerings, or for further inquiries, contact the COS Customer Liaison at Corporation for Open Systems International, 1750 Old Meadow Road, Suite 400, McLean, Virginia 22102. Telephone: (703) 883-2700 FAX: (703) 848-4572.

## AT&T fractional T-1 services hit market

continued from page 1

en the price cut] quickly, others will be moved a little later, but all will be given the price reduction immediately," said Woody Kerkeslager, director of business services for AT&T. Customers will be able to retain their existing analog data transmission equipment because the local access loops will remain unchanged.

The new higher speed services — 128K, 256K, 512K and 768K bit/sec, generally referred to as fractional T-1 services — will enable users to tie locations into T-1 backbone nets that do not generate enough traffic to justify the cost of a full T-1 line. The services are priced by the number of 64K bit/sec channels provided.

Analysts say fractional T-1 is most cost-effective for users that need four to 12 64K bit/sec channels for a single site ("Fractional T-1 high on many users' lists," *NW,* Jan. 23). Before fractional T-1, the only digital transmission options users had were T-1, T-3 and 56K bit/sec Dataphone Digital Service facilities.

For every dollar spent on a 400-mile Accunet Spectrum 64K bit/sec circuit, a customer would spend $1.15 on a voice-grade private line, $4.83 for a 56K bit/sec Dataphone Digital Service link and 69 cents for one channel in an Accunet T1.5 circuit, AT&T said.

But those savings shrink when shorter Accunet Spectrum lines are compared with voice-grade private lines. For every dollar spent on a 100-mile 64K bit/sec Accunet Spectrum link, a customer would spend $1.01 on a voice-grade private line, $3.52 for Dataphone Digital Service and 42 cents for one channel in an Accunet T1.5 link, the company reported.

Service pricing information provided by AT&T does not include the cost of local access, which could reduce or cancel out the savings realized by migrating analog private lines to Accunet Spectrum services.

Users contacted by ***Network World*** said they are pleased with the cost of the services.

"This pricing is amazing," said Daniel Gonos, store systems director for Domino's Pizza, Inc. "I could buy [an Accunet Spectrum] 56K, only use 9.6K and still pay less than what I pay today for a 9.6K [analog] private line."

Gonos said he will consider using Accunet Spectrum services to replace the 9.6K bit/sec analog private lines that link Domino's 16 regional offices to the company's corporate headquarters in Ann Arbor, Mich.

"Even if we're not sending data at those high speeds [56K bit/sec and up], if it's an opportunity to save money, we have to take a hard look at it," he said.

### Service rollout

Accunet Spectrum services are being introduced in 24 cities and are slated to be available in 175 cities within a year. Future capabilities include multipoint service and service management under AT&T's Unified Network Management Architecture.

Accunet Spectrum services are scheduled to become available on June 12. The services offer different features depending on the customer's application and type of access line used.

For customers that use voice-grade lines to access 56K bit/sec interoffice Accunet Spectrum lines, echo cancellation is provided. The service supports both voice and data transmission.

For customers that use 64K bit/sec digital data service or 1.544M bit/sec T-1 digital access, Accunet Spectrum supports 64K bit/sec clear-channel capability, which does not restrict the numbers of consecutive zeros transmitted. This enables customers to use the full 64K bit/sec bandwidth, whereas before an 8K bit/sec chunk of the pipe was reserved for AT&T's use.

Accunet Spectrum is priced per 64K bit/sec channel with fixed and per-mile charges in three mileage bands (0 to 50 miles, 51 to 100 miles, and 101 miles and up), plus a monthly $16.40 connection charge at each end of the circuit.

Monthly charges range from a fixed charge of $72 and $2.84 per mile for circuits 50 miles in length or shorter to a fixed charge of $248 and 32 cents per mile for circuits longer than 100 miles.

According to AT&T, pricing for intermediate bit rates (128K to 768K bit/sec) follows the same price structure but offers 5% to 10% discounts off single-channel pricing. ◘

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## Racal to buy up InterLAN unit

continued from page 78

market in the UK," said Sewall Hodges, a securities analyst with Arnhold and S. Bleichroeder, Inc. in New York. "Now that it's up and running as a separately traded business, they're devoting more attention to other businesses.

"Racal has a lot of money to spend, and I wouldn't be surprised to see them make more acquisitions," he added.

Hodges said he believes the deal bodes well for InterLAN customers. "Racal is far more financially secure than Micom and will be able to expand the range of InterLAN's products."

Dave Tolwinski, vice-president of business development for InterLAN, agreed with that analysis.

"It's a good marriage," he said. "Racal brings the investment backing of a $2.5 billion international company and gives us the financial strength to pursue more far-reaching global strategies. In return, we give them our knowledge derived from experience in the LAN business."

Tolwinski said InterLAN will fit better with Racal than it did with Micom. Micom "made no secret of the fact that they intended to sell InterLAN, so they didn't have any long-term aspirations for us. Racal is a committed, long-term partner." ◘

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### TUESDAY, JUNE 20

9:30 A.M. — 4:30 P.M.

**Tutorial-1**
**SNA Network Management**
You will learn about the latest trends in SNA network management and products, with an emphasis on the information you need to exploit the capabilities of various SNA network management tools in managing your network. Instructor is L. David Passmore, Partner, Network Strategies, a practice of Ernst & Whinney. Mr. Passmore is a frequent lecturer at industry conferences and teaches 3-day seminars for Systems Technology Forum.

**Tutorial-2**
**T1 Network Management**
This tutorial will give you in-depth coverage of the latest strategies and equipment for building and operating T1 networks. Coverage will include diagnostics, testing, dynamic bandwidth positioning, auto reroute, PC or workstation displays, and the impact of T3, UNMA, NetView, OSI, LAN/WAN internetworking and carrier-based T1 networks. Instructor is Timothy G. Zerbiec, Principal and Vice President of Technology for Vertical Systems Group in Boston.

**Tutorial-3**
**Integrated and Automated Network Management**
Network management is now an important strategic issue for users and vendors. This tutorial will review the two major standards for inter-system transfer of management information: the SNA-based de facto standard from IBM and a vendor-independent standard based on OSI protocols. It will chart a course for future improvements towards integrated management systems and a new generation of expert system management applications. Instructor is James G. Herman, a Principal with Northeast Consulting Resources, Inc. and well known writer and lecturer on network management and planning issues.

**Tutorial-4**
**LAN Management**
This tutorial will take an in-depth look into the management of today's LANs. Topics will include design, implementation, operational management and the evolution of LANs. You will receive guidance in evaluating design alternatives, equipment acquisition decisions and useful techniques in LAN management. Instructor is David deS. Couch, Corporate Communications Manager, Spartan Stores. He is currently responsible for the design and implementation of the corporate communication network for Spartan's corporate offices and 500 member retail stores.

## Get hands-on information from leading vendors at our demonstration suites

Starting Tuesday afternoon and continuing through Thursday, you will have the opportunity to visit demonstration suites provided by our sponsors. Talk to technical experts, and get hands-on demonstrations of products from leading vendors, including AT&T, Cincom Systems Inc., DCA, Digital Equipment Corp., Hewlett-Packard, MCI, US WEST Network Systems, Inc. and more.

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### WEDNESDAY, JUNE 21

8:00 — 10:00 A.M.
**X.1 Industry News and Announcements**
The latest networking product news in a panel session chaired by Gary Beach of *Network World.*

10:15 — 11:00 A.M.
**X.2 Keynote Address**
By Mark Teflian, Vice President for Technical Planning and System Engineering, Covia, a partnership of United Airlines, US Air, British Airway, KLM Royal Dutch Airways, Swiss Air and Alitalia.

11:15 A.M. — Noon
**Sponsor Briefings**
Save time and effort by learning current network management solutions from key industry players such as Data Switch Corp., Infotron, Northern Telecom, Inc., Strata-Com, Inc. and Timeplex, Inc. These sessions will deliver maximum information in a minimum amount of time.

12:00 — 1:30 P.M.
**Lunch**
Excellent time to visit demonstration suites.

1:30 — 2:15 P.M.
**2.1 Real Time Management**
This session will provide a "how-to" approach for operating networks for real time processing.

**2.2 Implementing the Standards — Progress Towards OSI**
The standards community activists will bring you up-to-date on progress of making network management under OSI "real."

2:30 — 3:15 P.M.
**Sponsor Briefings**

3:30 — 4:15 P.M.
**4.1 LAN Management**
In the face of many different LAN standards and products, how will the LAN users "migrate" towards a standards-based universal solution?

**4.2 The Next Five Years: Technology Forecast**
The senior technical members of the OSI/Network Management Forum will present a formal technological forecast of hardware, software and carrier service developments in network management.

4:30 — 5:15 P.M.
**Sponsor Briefings**

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## June 20-22, 1989

## Chicago

## THURSDAY, JUNE 22

8:30 – 9:15 A.M.
**6.1 IBM NetView PC Products**
The current and expected capabilities of the IBM PC and PS/2 approach to network management will be reviewed and discussed.

**6.2 Packet Network Management**
This session will give you some approaches and solutions to the management problems of packet networks.

9:30 – 10:15 A.M.
**Sponsor Briefings**

10:30 – 11:15 A.M.
**8.1 TCP/IP Network Management**
This session compares Simple Network Management Protocol (SNMP) with other methods of network management and shows how it could evolve into an OSI approach in the future.

**8.2 Expert Systems/AI-based Network Management**
In this session you will learn how artificial intelligence-based systems offer users a "smart" package to manage the network management system.

11:30 A.M. – 12:15 P.M.
**Sponsor Briefings**

12:00 – 1:30 P.M.
**Lunch**
Another good opportunity to visit demonstration suites.

1:30 – 2:15 P.M.
**10.1 Managing IBM Networks without NetView**
This session will define mainstream approaches to managing IBM System Network Architecture (SNA) networks, and present case histories.

**10.2 User Administration**
Many user organizations find network management costs for hardware, people and administration an unplanned expense. How can the cost be justified? What mechanisms can be used to provide "hands-off" control of the network as a part of the basic architecture?

2:30 – 3:15 P.M.
**Sponsor Briefings**

3:30 – 4:15 P.M.
**12.1 User Experience Panel**
In a fitting program finale, actual case histories of successful network management implementation will be presented by the winners and runners-up for the *Network World* NMS Award.

## Conference Presenters

***Network World*** is the leading newsweekly for communications executives and professionals at organizations using voice, data and video communications.

**OSI/Network Management Forum** is a global consortium developed by 13 major worldwide computing and communications organizations to accelerate the introduction of compatible network management products. The members of OSI/Network Management Forum endorse the international standards model known as Open Systems Interconnection (OSI) for simplifying the management of multivendor networks for voice and data communications.

Voting Members are Amdahl Corp., AT&T, British Telecom, Digital Communications Associates Inc., GEC Plessey Telecommunications Ltd., Hewlett-Packard. MCI Telecommunications, MicroTel Ltd., Nippon Telegraph, Northern Telecom Inc., STC PLC, Telecom Canada, and Unisys Networks.

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## Schedule and Pricing Summary

**Dates:** Tuesday, June 20 through Thursday, June 22, 1989

**Location:** The Swiss Grand Hotel, 323 East Wacker Drive, Chicago, IL.

| | | |
|---|---|---|
| **Schedule:** | All-Day Tutorials | Tuesday 9:30 A.M. - 4:30 P.M. |
| | Conference | Wednesday 8:00 A.M. - 5:15 P.M.<br>Thursday 8:30 A.M. - 4:15 P.M. |
| | Demonstration Suites | Tuesday 4:30 P.M. - 6:30 P.M.<br>Wednesday 10:00 A.M. - 6:00 P.M.<br>Thursday 10:00 A.M. - 4:00 P.M. |

**Registration Fees:**

| | |
|---|---|
| Full Conference Registration: | $625 per person |
| One-Day Tutorial only: | $395 per person |
| Two-Day Conference only: | $395 per person |

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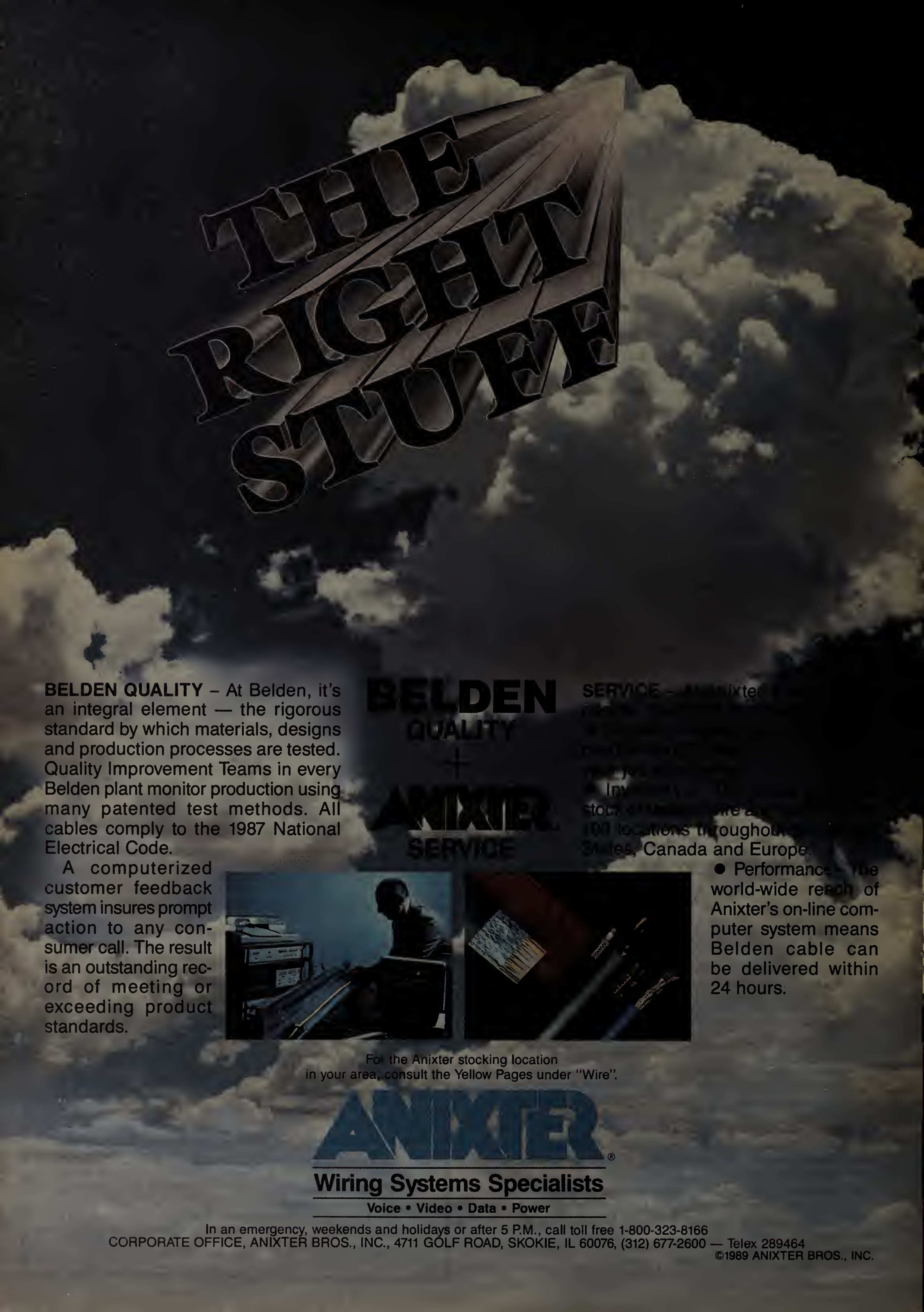
☐ I would like more information.



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